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Abstract

Nitrogen dioxide is one of the U. S. EPA's criteria pollutants, and one of the main ingredients needed for the production of ground-level ozone. Both ozone and nitrogen dioxide cause severe public health problems. Existing satellites have begun to produce observational data sets for nitrogen dioxide. Under NASA's Earth Science Applications Program, we examined the relationship between satellite observations and surface monitor observations of this air pollutant to examine if the satellite data can be used to facilitate a more capable and integrated observing network. This report provides a comparison of satellite tropospheric column nitrogen dioxide to surface monitor nitrogen dioxide concentration for the period from September 1996 through August 1997 at more than 300 individual locations in the continental US. We found that the spatial resolution and observation time of the satellite did not capture the variability of this pollutant as measured at ground level.

The tools and processes developed to conduct this study will be applied to the analysis of advanced satellite observations. One advanced instrument has significantly better spatial resolution than the measurements studied here and operates with an afternoon overpass time, providing a more representative distribution for once-per-day sampling of this photochemically active atmospheric constituent.

Table of Contents

1 Executive Summary

We compared NO_2 observations from the space-based Global Ozone Monitoring Experiment (GOME) instrument on the Second European Remote Sensing (ERS-2) satellite to United States Environmental Protection Agency (EPA) surface network measurements of NO_2. This work was performed to prepare for similar comparisons of NASA's Ozone Monitoring Instrument (OMI) NO_2 observations when they become available. The satellite-surface comparisons indicate that GOME's large footprint (320 x 40 km^2) poorly represents the spatial variability of NO_2 as determined by the surface network observations. OMI will have significantly better spatial resolution (24 x 13 km^2 at nadir). In addition, GOME measurements are performed from an orbit with a 10:30 local overpass time. At this time of day, large and rapid changes in the NO_2 concentration occur. The OMI overpass occurs at 13:30 local, with less rapidly changing NO_2 concentration.

This work was funded by NASA's Earth Science Applications Program within the Applied Sciences Program of NASA's Science Mission Directorate. Applied Sciences supports prototyping and benchmarking the use of NASA-sponsored observations from remote sensing systems, and predictions from scientific research and modeling, to expand and accelerate the use of knowledge, science, and technologies to serve society.

2 Introduction

The Earth System responds to both naturally occurring and human-induced change. NASA's Science Mission Directorate (SMD) seeks to understand the forcings and response of the Earth System via long-term observations from ground networks, sub-orbital platforms, and space-based assets. The role of the Earth Science Applications Program within the Science Mission Directorate is to incorporate these observations into decision support tools employed by partner Agencies and to assess the performance of these measurements in decision support tools. The approach is to enable the use of Earth Science mission outputs (i.e., models and remote sensing data products) to serve as inputs to decision support systems. Ultimately, the desired outcome is an enhanced decision support tool that results in significant socio-economic benefits.

2.1 Criteria Pollutant and Scientific Rationale

Under the Clean Air Act of 1990 (http://www.epa.gov/oar/caa/), the EPA is required to set standards for concentrations of air quality pollutants, ensure these standards are met through monitoring, and establish a consistent means of reporting air quality to the public, which, currently, is the Air Quality Index (AQI). The EPA is currently setting air quality standards related to the concentration levels of six main air pollutants: ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide, and lead. Nitrogen oxides (NO_x) include NO and NO_2, both highly reactive gases. NO is colorless and odorless, however NO_2 can many times be seen as a red-brown layer over urban areas. NO_x is a byproduct of combustion with 95% of NO_x emissions from combustion in the form of NO [1]. Exhaust from motor vehicles accounts for 49% of NO_x emissions. Other sources are electric utilities, and industrial, commercial and residential burning of fossil fuels [2]. Between 1980 and 1999 NO_2 emissions have increased by 4% while emissions of all other criteria pollutants have decreased (between 1998 and 1999 carbon monoxide and lead emissions have increased slightly while NO_2 emissions have decreased slightly) [1].

There are many health and environmental impacts of NO_x. NO_x is one of the main ingredients needed for the production of ground-level ozone [3], [4], [5], [6]. Both NO_2 and ozone can cause serious respiratory problems [7], [8] and references cited therein. NO_x reacts to form nitrate particles and acid aerosols which contribute to acid deposition and nutrient overload in water [7], [9]. Excesses of NO_x also decrease visibility [10]. In addition, when sequestered in a reservoir species, NO_x can be transported long distances by prevailing winds and affect air quality in regions many miles from the source [11], [12], [13], [14].

The EPA has a ground network of monitoring stations around the US that are currently being used to monitor NO_2 concentration in well populated areas. Quantative satellite data can be validated against the surface network in urban areas. Once validated, the satellite data can provide NO_2 distributions in remote continental areas, far from the surface network stations, extending the integrated observing network. NASA satellite data may serve as a top-down constraint on emissions inventories for NO_2, and could also provide evidence of longrange transport between regions.

2.2 Ground-based Measurement Characteristics

The EPA ground network consists of in-situ NO_2 monitoring stations located throughout the country, with higher concentrations of monitors in more densely populated regions.

These monitors are operated by the State and Local Air Monitoring Stations (SLAMS) and National Air Monitoring Stations (NAMS) networks. NO_2 concentrations are measured using the chemiluminescence method. This method first converts NO_2 to NO in a heated catalytic converter (typically molybdenum) followed by reaction of NO with ozone. This

reaction forms an excited state of NO_2 which releases a photon as it returns to a lower energy state. The photons are measured with a PMT (photomultiplier tube). The PMT signal is proportional to the amount of NO in the sample. The detection limit of the EPA monitors is 5 ppbv. Since the catalytic conversion is not specific to NO_2, the chemiluminescence technique has been reported to overestimate NO_2. Interferences by other chemical species are considered small in urban areas where emissions are fresh. However, in rural and remote regions where air mass aging can be a factor, this method can over predict NO_2 levels [1]. Information on the list of designated reference and equivalent methods for NO_2 can be found at http://www.epa.gov/ttn/amtic/files/ambient/criteria/ref905.pdf (last updated Sept. 2005).

2.3 Satellite-based Measurement Characteristics

The Global Ozone Monitoring Experiment (GOME), aboard the European Space Agency's Second European Remote Sensing (ERS-2) satellite has a 10:30am local equatorial overpass time along a sun-synchronous polar orbit. GOME has a full swath width of 960 km which is divided into three ground pixels (east, central or nadir, and west) relative to viewing straight down, for a 40 km$\times$320 km spatial resolution [15]. GOME has a 100 minute orbit which results in 14 orbits per day achieving global coverage in three days. For additional information regarding GOME, see [15].

The GOME data product utilized in this study is nitrogen dioxide tropospheric column. A detailed discussion of the method used to derive the tropospheric nitrogen dioxide column is given in [16]. In general, the stratospheric column is subtracted from the total column to yield the tropospheric column. The stratospheric NO_2 column is approximated by using the total NO_2 column over the central pacific where tropospheric NO_2 is relatively low. Note that GOME was not designed to measure tropospheric nitrogen dioxide; this product was developed after launch to support energing scientific interest in tropospheric composition. The NO_2 column is sensitive to clouds, aerosols, and surface albedo, which increase the error in tropospheric NO_2 column. In addition, the GOME morning overpass occurs at a time of rapid change in tropospheric NO_2 as NO_x begins to repartition into NO and NO_2.

2.4 Objective of Comparison

The objective of this work is to determine the quantitative relationship between tropospheric column NO_2 as measured from space by GOME and the surface distribution of NO_2 as measured by the EPA regulatory network.

3 Site-by-site Satellite/In-Situ Comparison

3.1 Background on Time Period

The time period chosen for this analysis is September 1, 1996 through August 31, 1997. The specific dates were chosen based on availability of data. The length of time chosen allows for an analysis of the robustness of this comparison on a seasonal basis.

3.2 Coincidence Criteria

For the correlation analysis presented in Section 3.3, the data pairs of satellite tropospheric NO_2 column and ground-based NO_2 concentration must be collocated in space and time. For every ground station, the 40×320 km^2 GOME observations that include the longitude and latitude of the site are accumulated. The hourly surface NO_2 data are then linearly interpolated to the time of each GOME observation. Only surface observations within plus or minus one hour are considered for possible temporal coincidences.

3.3 Time Series Analysis

In Figure 1, an example of the GOME tropospheric column NO_2 and surface NO_2 concentration time series for summer 1997 is presented. The time series plots for all the stations

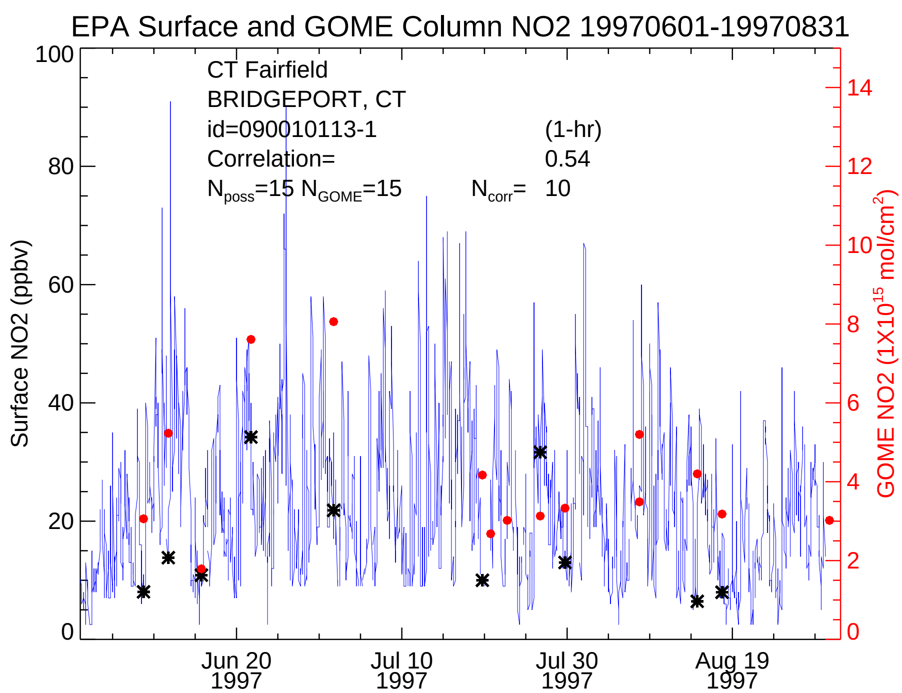


Figure 1: Time-series and correlations between GOME NO_2 and hourly ground NO_2 concentrations for site 090010113 in Bridgeport, CT. Hourly surface NO_2 concentration is shown with the blue line. Coincident values are represented by symbols, a red bullet is GOME tropospheric column NO_2 and an asterisk is hourly surface NO_2 concentration.

for fall 1996, winter 1996-97, spring 1997, and summer 1997 are provided in Appendix A on page 39. In this analysis, we used the following seasonal definitions: September 1 through

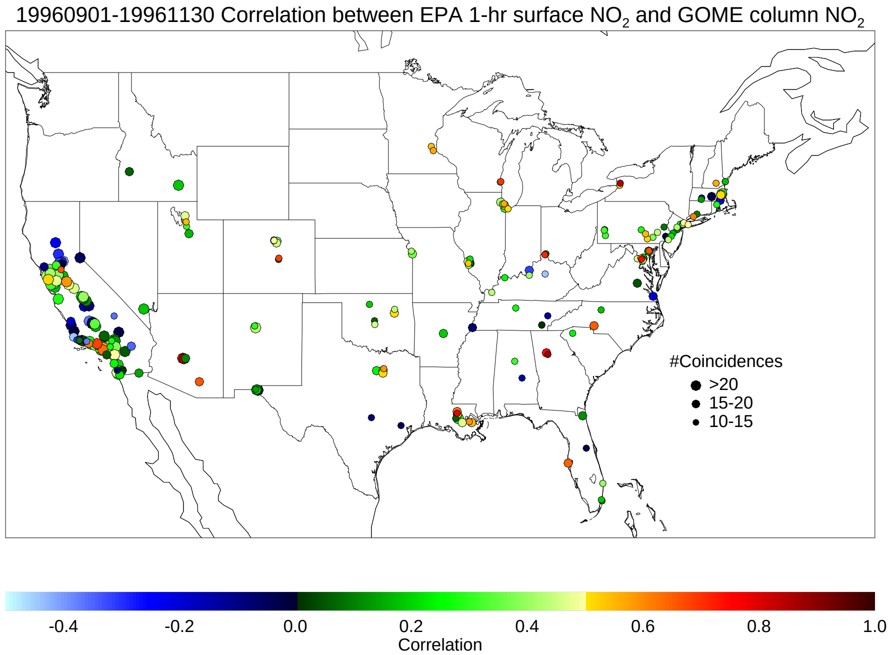
November 30, fall; December 1 through February 28, winter; March 1 through May 31, spring; and June 1 through August 31, summer. The state and county, Metropolitan Statistical Area (MSA) description, and station ID are reported in the figures. If the site is rural, the MSA description is listed as "Not in an MSA".

Figure 1 shows the hourly surface NO_2 concentration during summer 1997. The left vertical axis is surface NO_2 concentration given in parts per billion by volume (ppbv) and the right vertical axis is GOME tropospheric column NO_2, given in molecules per cm^2. Correlations are derived from coincident GOME tropospheric column NO_2 and surface NO_2 pairs as described in Section 3.2 on the facing page. N_{poss} is the total number of GOME viewing opportunities over the site and N_{GOME} corresponds to the number of passes that NO_2 tropospheric columns could be determined (limited by surface albedo, cloud cover, and aerosols). The number of coincident data pairs used to determine the correlation is reported as N_{corr}. At least ten coincident data pairs are required to calculate a correlation.

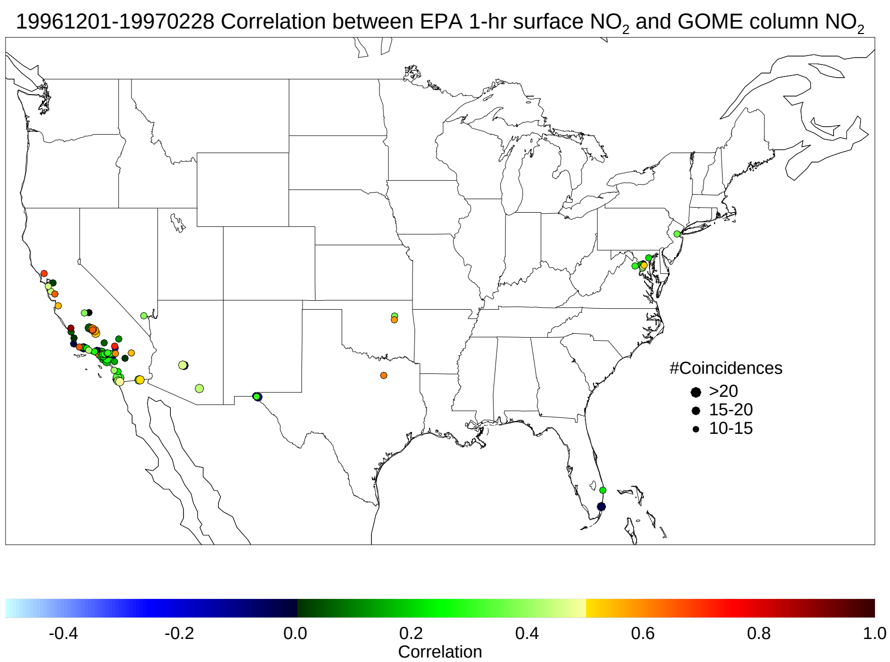
3.4 Site-by-site Correlation Analysis

Figure 2 on the next page summarizes the GOME tropospheric column NO_2 density and surface NO_2 correlations derived from the time series for each ground station across the United States (see Appendix A on page 39). A summary is shown for fall (a), winter (b), spring (c), and summer (d). The size of the point plotted indicates the number of coincident data pairs at a particular location for each season shown. The color indicates the value of the correlation coefficient. This correlation summary provides a site specific and geographical perspective on how well the GOME tropospheric column NO_2 density retrievals depict the variability in surface NO_2 concentration. The value of the correlation varies widely from season to season and station to station. There are several reasons for this (which are also site specific) including the size of the GOME footprint. As an example, in the summer two stations located in northern Kentucky (Davies KY, station ID 210590005 and Henderson KY, station ID 211010013) are close geographically yet yield very different correlations. These stations both fall within the same GOME footprint, however it is possible the stations are sampling different air masses. On July 12, at the time of the GOME overpass, Davies reports 33 ppbv of NO_2 while Henderson reports 8 ppbv. GOME cannot resolve the smaller scale variability.

Figure 3 on page 10 shows histograms of the site-by-site correlations for fall (top left), winter (top right), spring (bottom left), and summer (bottom right). The histograms show correlations for a total of 242 ground stations (fall), 82 (winter), 216 (spring), and 245 (summer). The histogram bin with the maximum number of stations is 0.3 to 0.4 for fall and 0.2 to 0.3 for the remaining seasons. Between 49% and 56% of the stations have correlations within the 0.1 to 0.5 range. Less than 5% of the stations have correlations above 0.7.

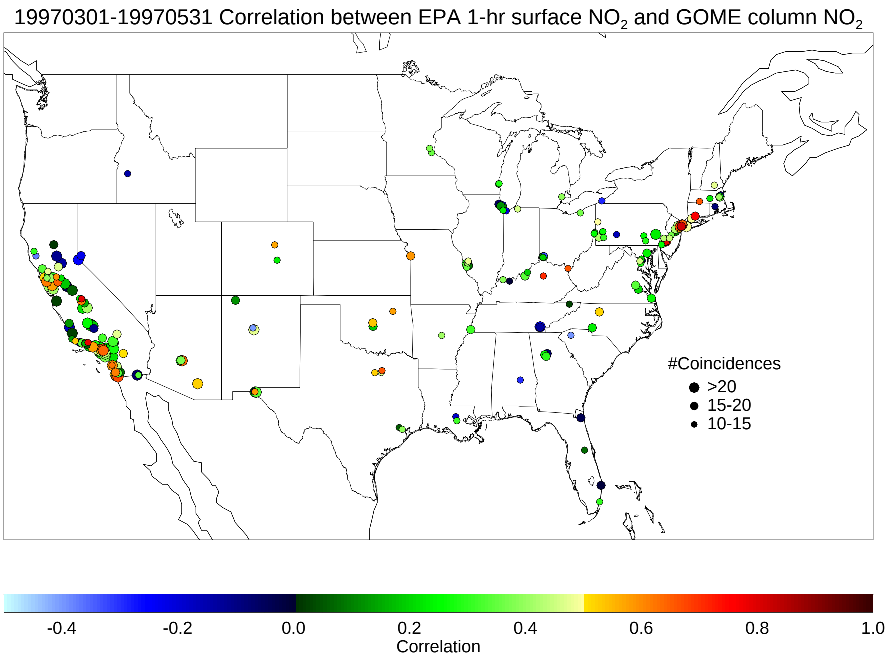


(a) Fall.

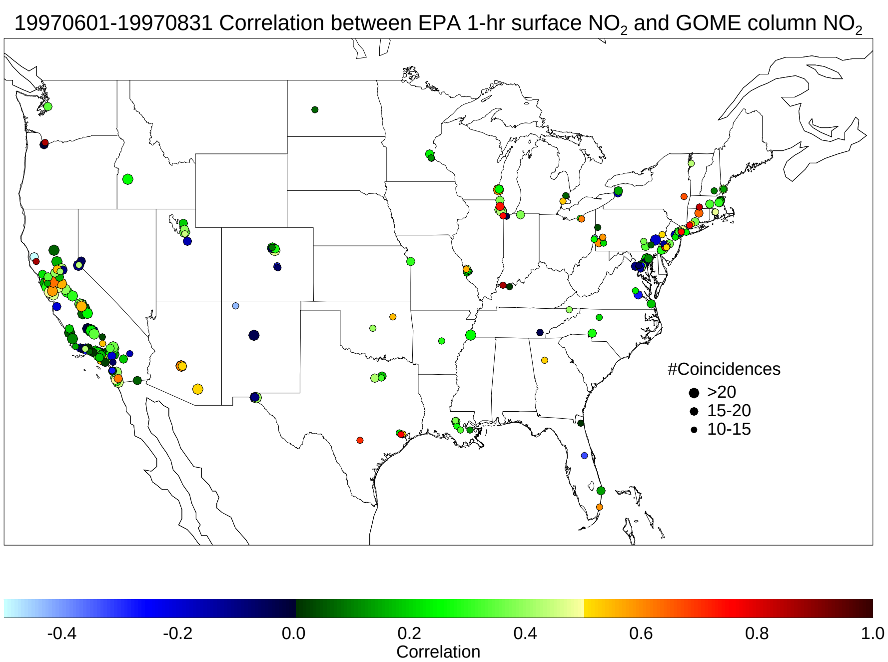


(b) Winter.

Figure 2: National summary plot of correlations between GOME tropospheric column NO_2 and EPA hourly NO_2 concentration for September 1996 through August 1997.



(c) Spring.



(d) Summer.

Figure 2: Concluded.

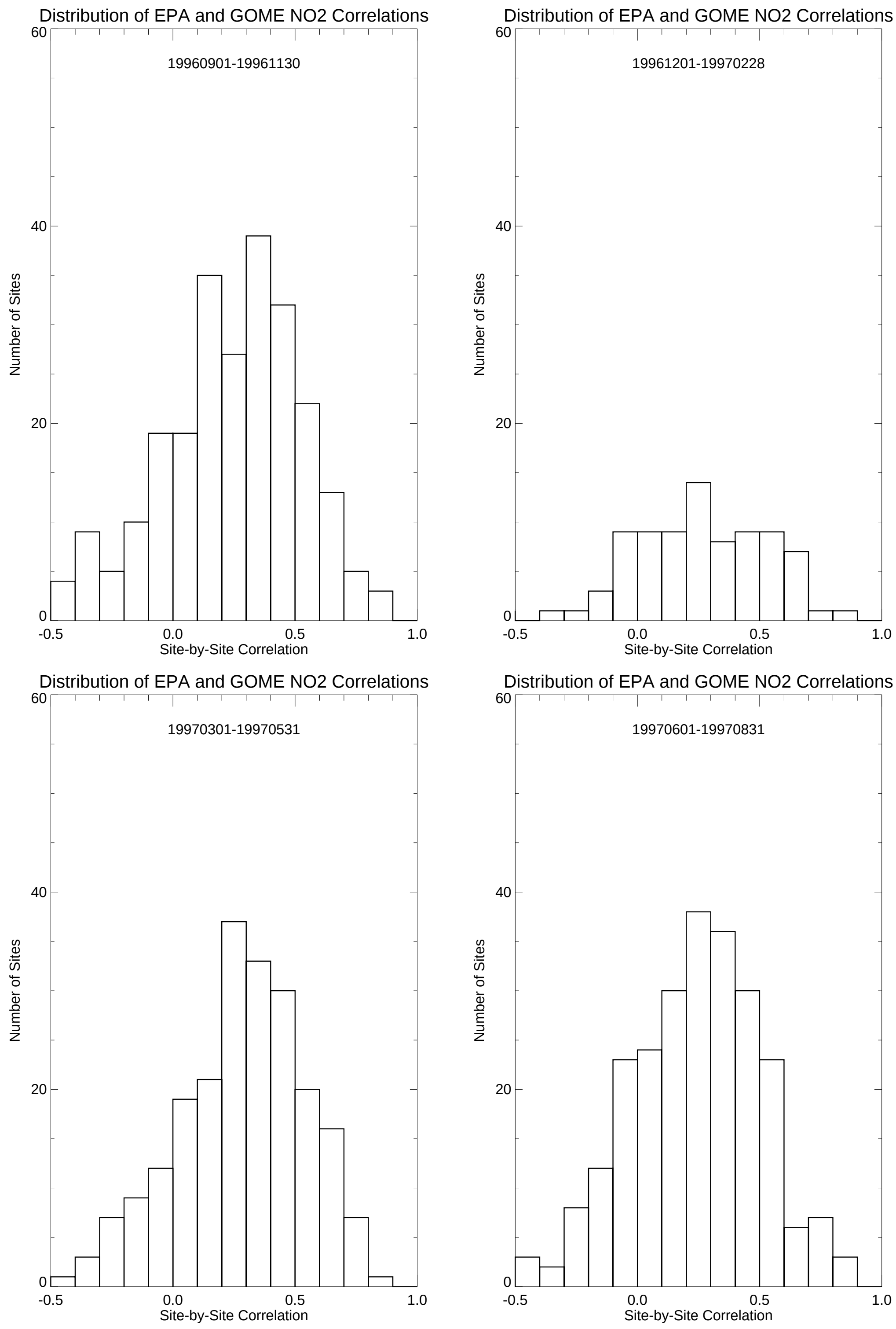


Figure 3: Histograms of the site-by-site correlations between coincident GOME tropospheric column NO_2 and EPA surface NO_2 concentration for fall 1996, winter 1996-97, spring 1997, and summer 1997.

4 National Satellite and In-Situ Comparisons

4.1 Maps of 80 km Binned Mean GOME Nitrogen Dioxide Statistics

Figure 4 on the following page shows maps of the mean GOME tropospheric column NO_2 density for fall 1996 (a), winter 1996-97 (b), spring 1997 (c) and summer 1997 (d). To construct these maps, all the GOME column NO_2 granules (40 km$\times$320 km spatial resolution) obtained for each season are mapped onto the Eta Data Assimilation System (EDAS) 80 km grid. The mean, the standard deviation, and the counts of GOME column NO_2 at each grid point are derived from the re-gridded GOME tropospheric column NO_2 density. The areas in black are where no GOME column NO_2 is retrieved over a 80×80 km^2 grid for the entire season.

In general the highest GOME NO_2 tropospheric column density occurs where there is more urban activity (over the eastern region of the United States and southern California) for all seasons. A seasonal variability is observed in the eastern US with a maximum occurring in the winter and minimum in the summer. This is consistent with slower photochemical activity during the winter.

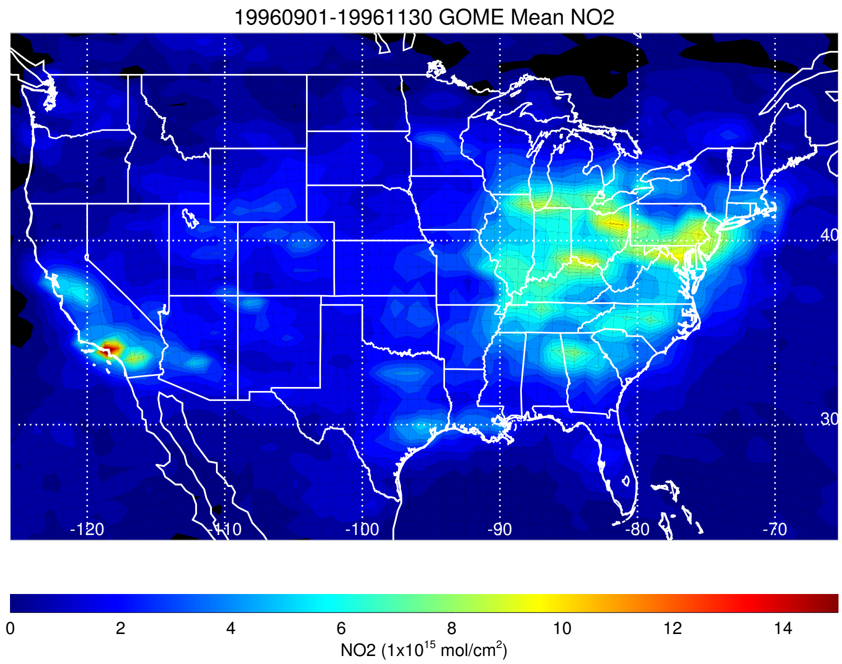
Figure 5 on page 14 shows the seasonal maps of the standard deviation of the 80 km binned GOME tropospheric column NO_2 density for fall 1996 (a), winter 1996-97 (b), spring 1997 (c) and summer 1997 (d). Figure 6 on page 16 shows the seasonal maps of the number of GOME tropospheric column NO_2 retrievals used to obtain the 80 km binned statistics for fall 1996 (a), winter 1996-97 (b), spring 1997 (c) and summer 1997 (d). The standard deviation is greatest in the winter with highest values occurring in the northeastern US. Regions of higher standard deviations also occur in the central Midwest and southern California in the winter. During the winter across the northern United States the number of retrievals is typically lower than five. This is a result of GOME's sensitivity to surface albedo. Localized regions of higher standard deviations such as in southern California reflect real variations in NO_2 associated with major urban areas. During the summer GOME has fewer retrievals in the eastern US than in the western US, with a minimum over Kentucky, due to the greater frequency of cloud cover in the summer [17], [18].

4.2 Site-by-site Mean Statistics

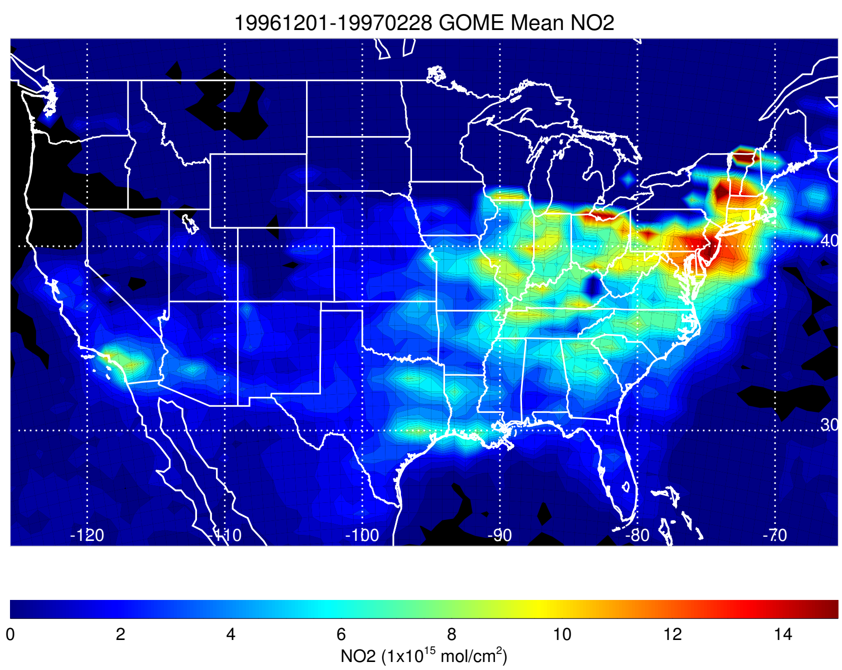
The amount of information that GOME tropospheric column NO_2 density could potentially contribute to characterization of the mean spatial distribution of EPA surface NO_2 concentration is quantified by comparing the site-by-site mean and standard deviations of the EPA ground stations and GOME tropospheric column NO_2 density. Figure 7 on page 18 shows the site-by-site distribution of mean EPA surface NO_2 concentration (top) and mean GOME tropospheric column NO_2 density (bottom) for fall 1996. Winter, spring, and summer maps are shown in Figure 8 on page 19, Figure 9 on page 20, and Figure 10 on page 21, respectively.

In general the GOME tropospheric column NO_2 density values show the same trends as EPA surface NO_2 concentration. One notable exception is southern Pennsylvania and the northeast corridor from Washington DC to New York City. In this region during fall, winter, and spring, the GOME tropospheric column NO_2 density is elevated relative to the GOME values at other sites while the EPA surface NO_2 concentration is not as elevated. This difference is likely due to NO_2 transport above the boundary layer and therefore not sampled by the EPA surface network.

Figure 11 on page 22 shows the site-by-site distribution of the standard deviation of the coincident EPA ground station NO_2 concentration (top) and mean GOME tropospheric column NO_2 density (bottom) for fall 1996. Winter, spring, and summer maps of the

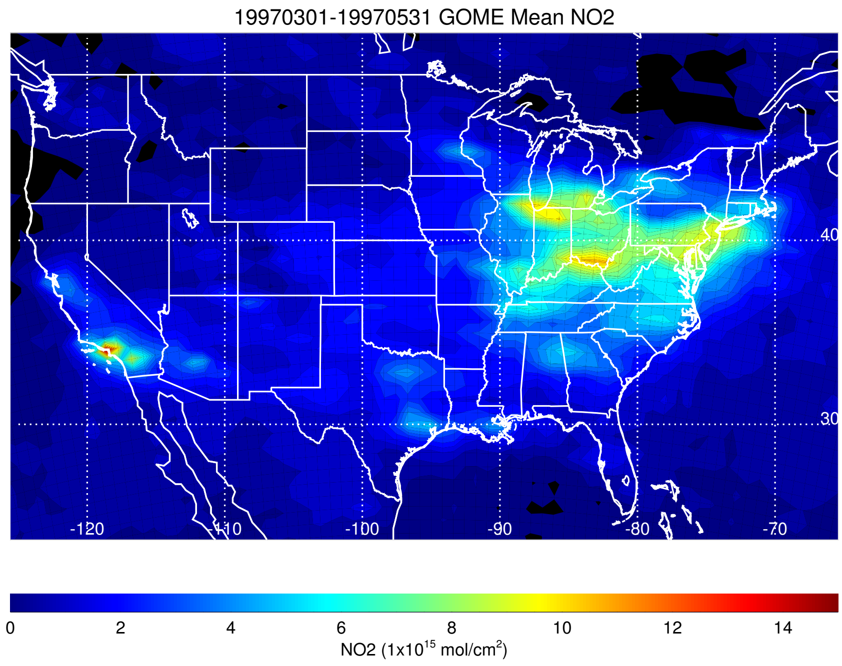


(a) Fall.

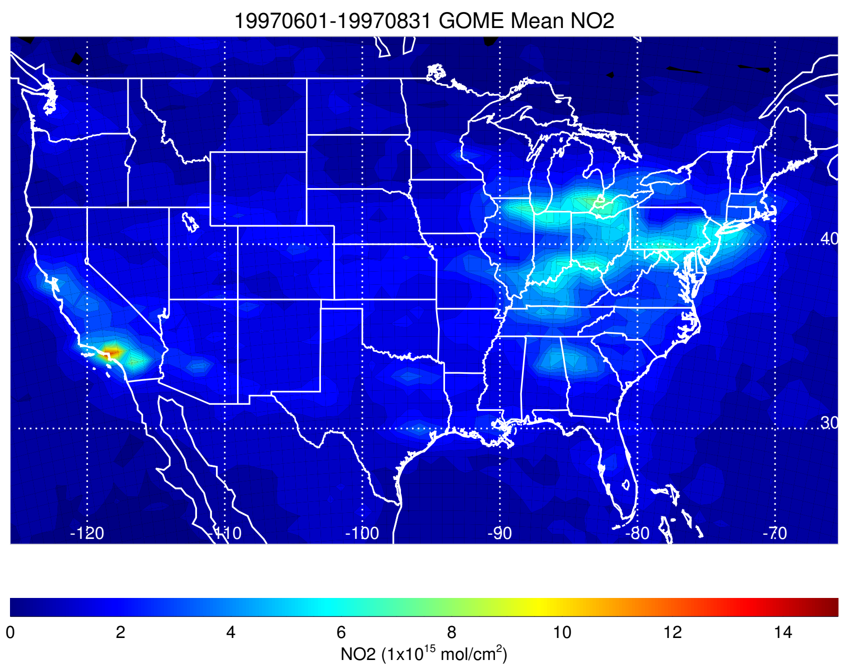


(b) Winter.

Figure 4: Map of the mean 80 km GOME NO_2 for September 1996 through August 1997.

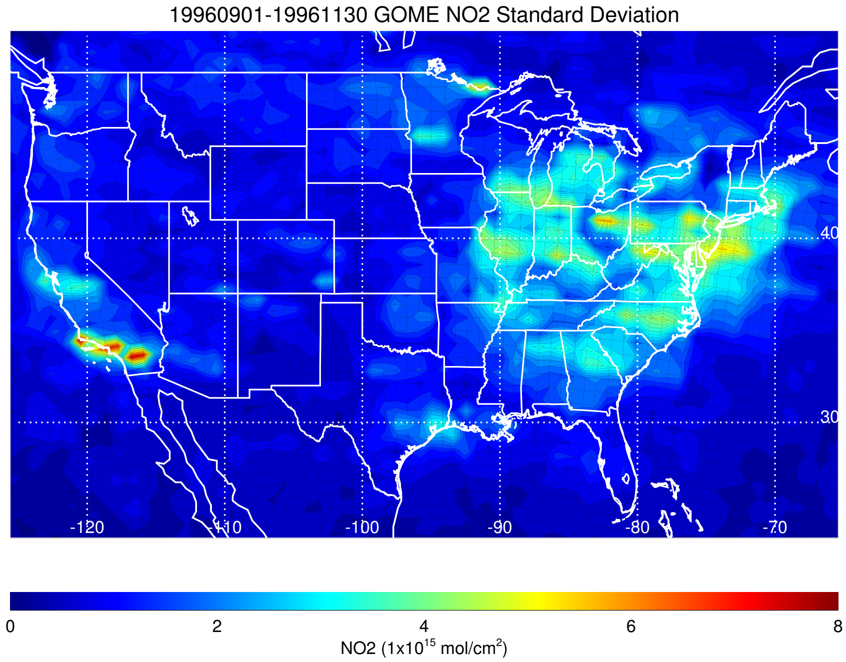


(c) Spring.

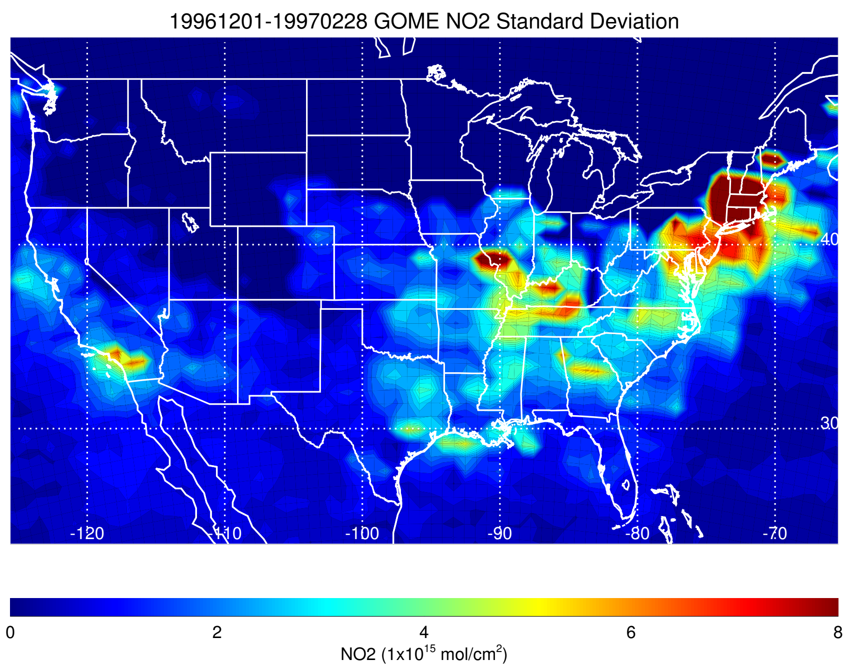


(d) Summer.

Figure 4: Concluded.

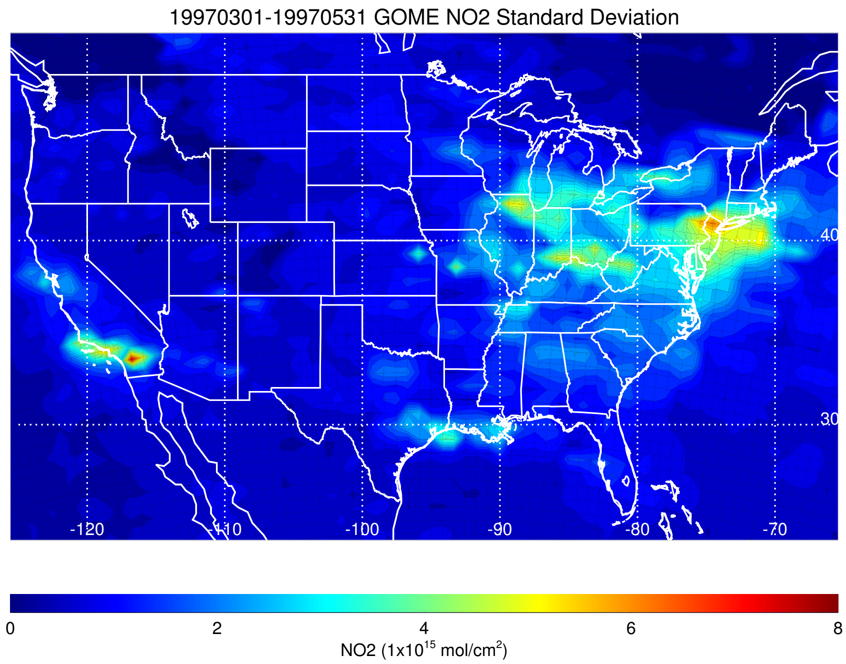


(a) Fall.

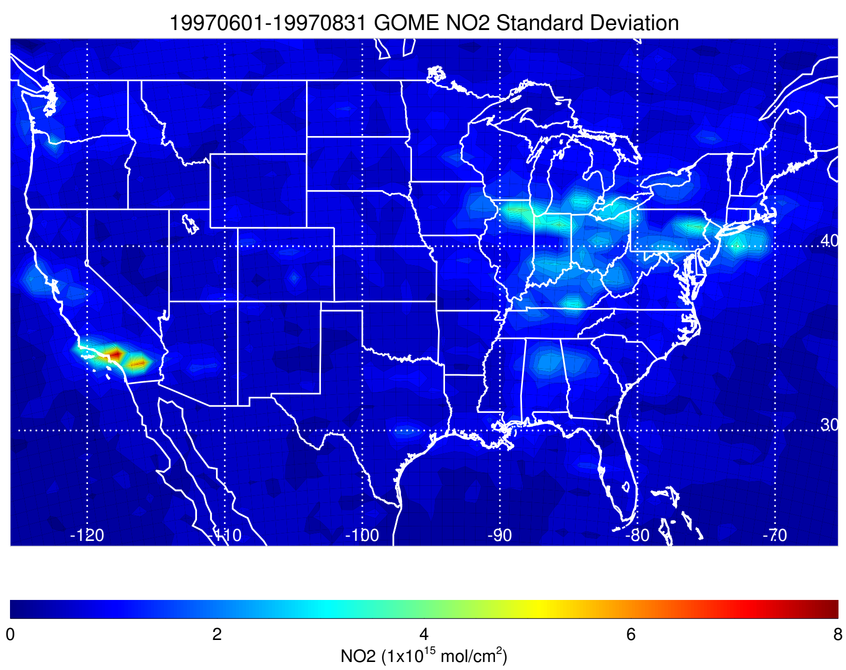


(b) Winter.

Figure 5: Map of the standard deviation of the 80 km binned GOME NO_2 for September 1996 through August 1997.

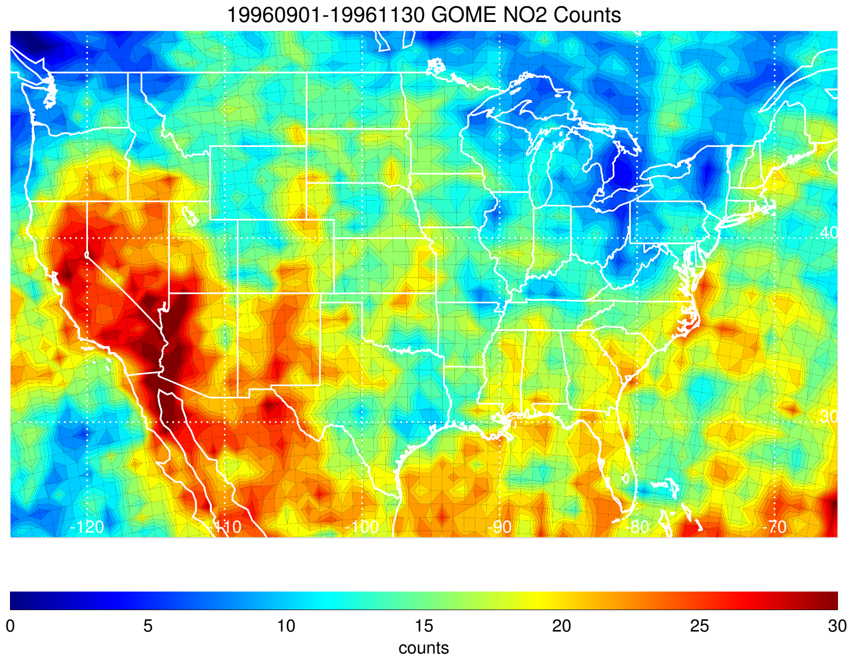


(c) Spring.

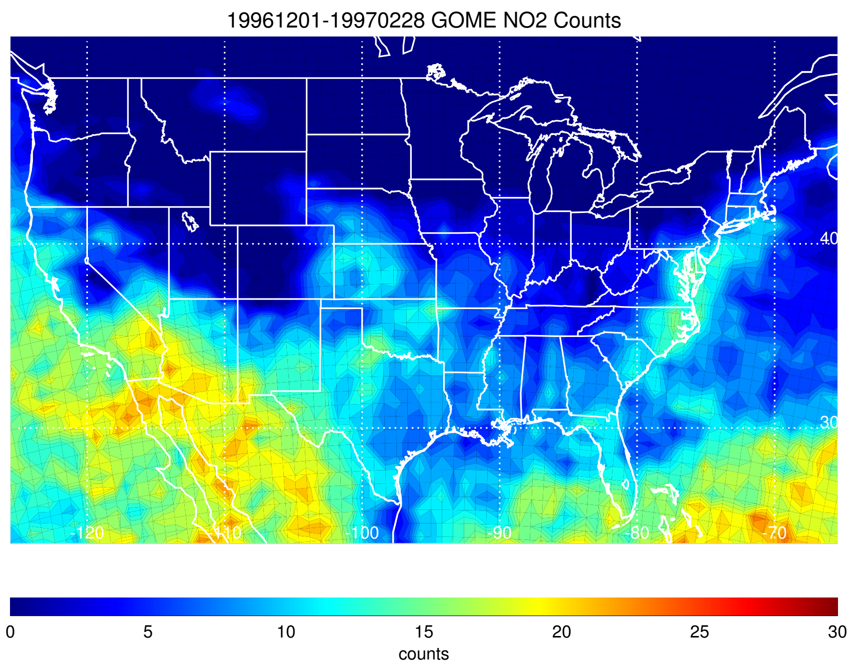


(d) Summer.

Figure 5: Concluded.

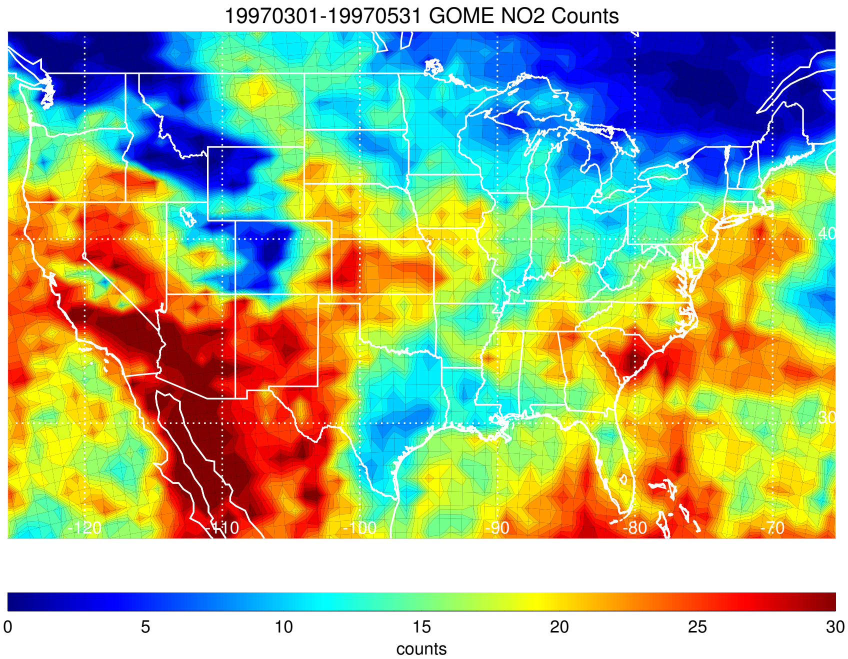


(a) Fall.

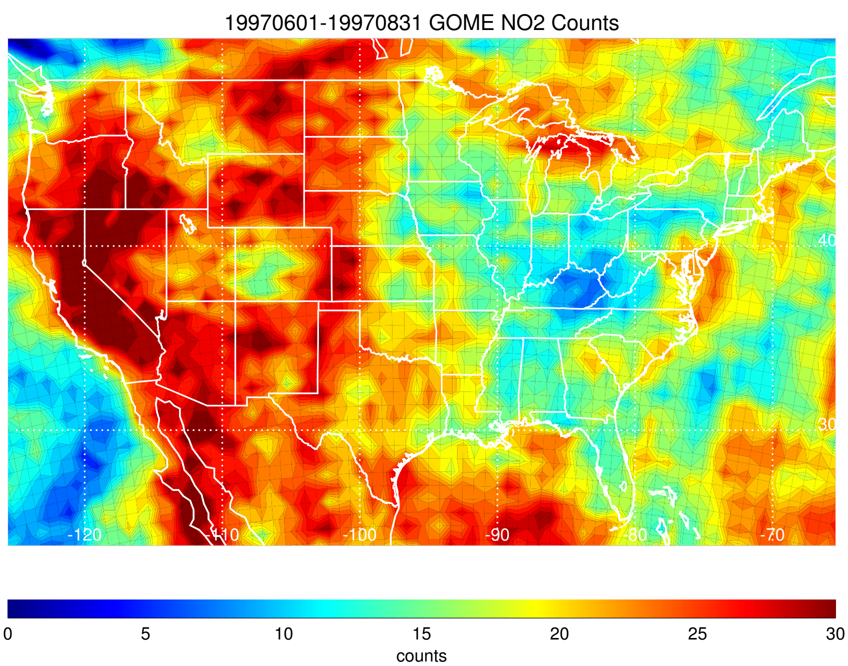


(b) Winter.

Figure 6: Map of the number of GOME NO_2 retrievals within each 80 km bin for September 1996 through August 1997.

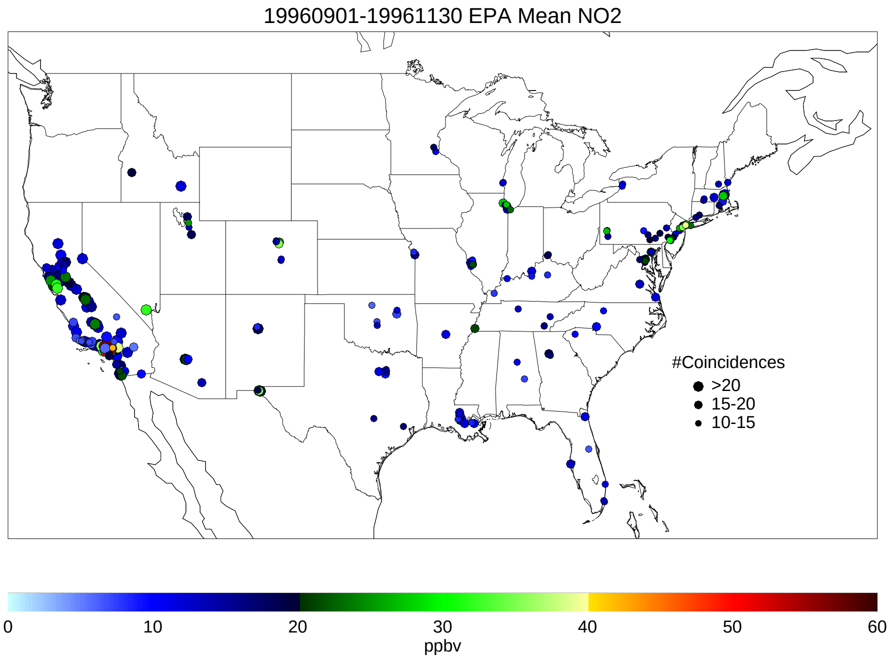


(c) Spring.



(d) Summer.

Figure 6: Concluded.



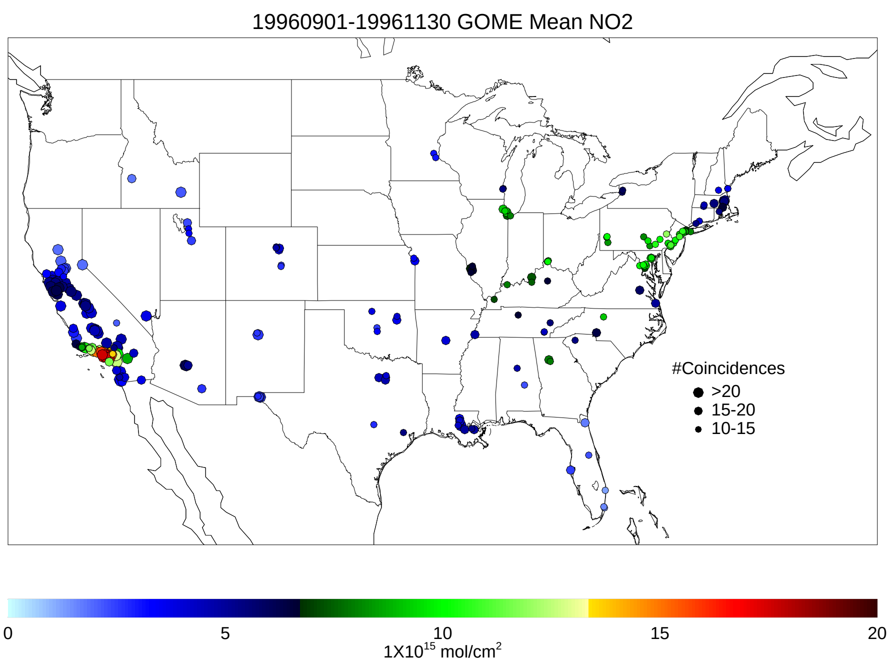
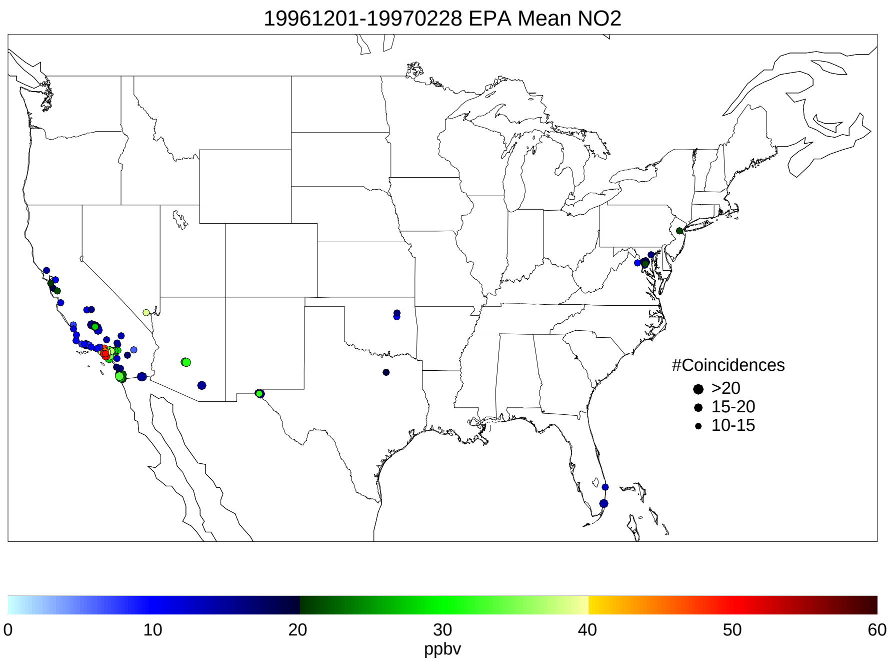


Figure 7: Site-by-site distribution of mean EPA surface NO_2 concentration (top) and GOME tropospheric column NO_2 (bottom) for fall 1996.



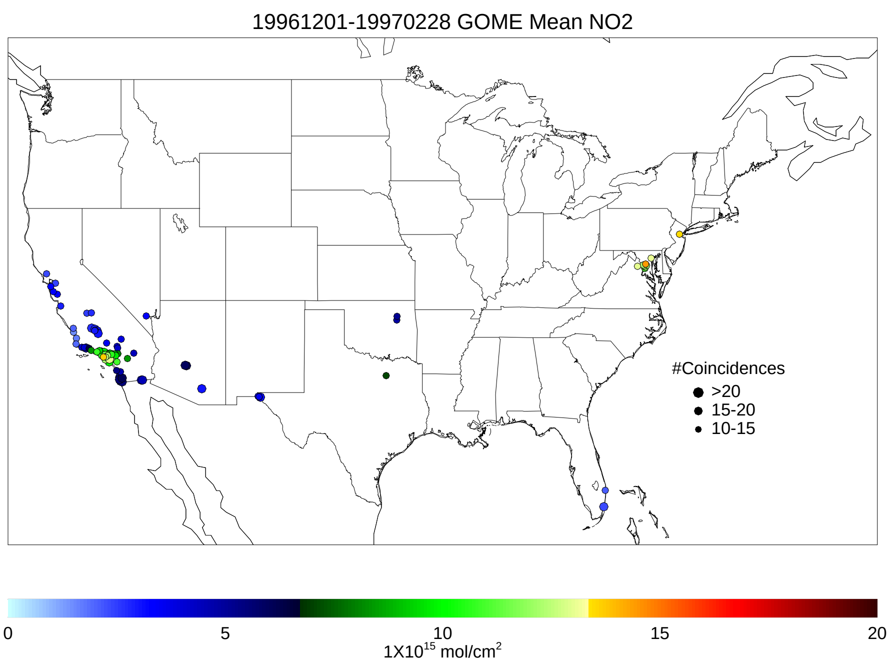


Figure 8: Site-by-site distribution of mean EPA surface NO_2 concentration (top) and GOME tropospheric column NO_2 (bottom) for winter 1996-97.

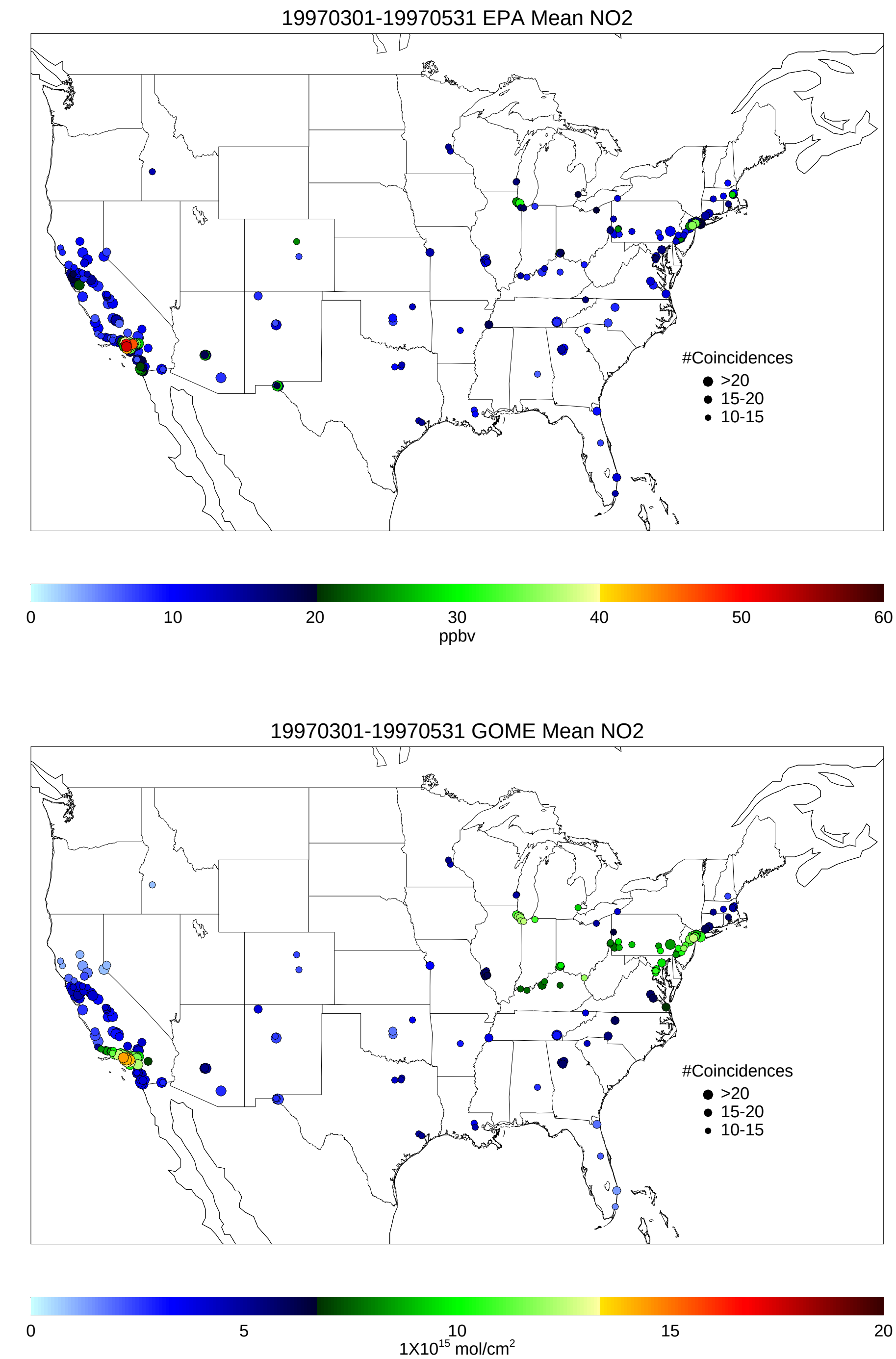


Figure 9: Site-by-site distribution of mean EPA surface NO_2 concentration (top) and GOME tropospheric column NO_2 (bottom) for spring 1997.

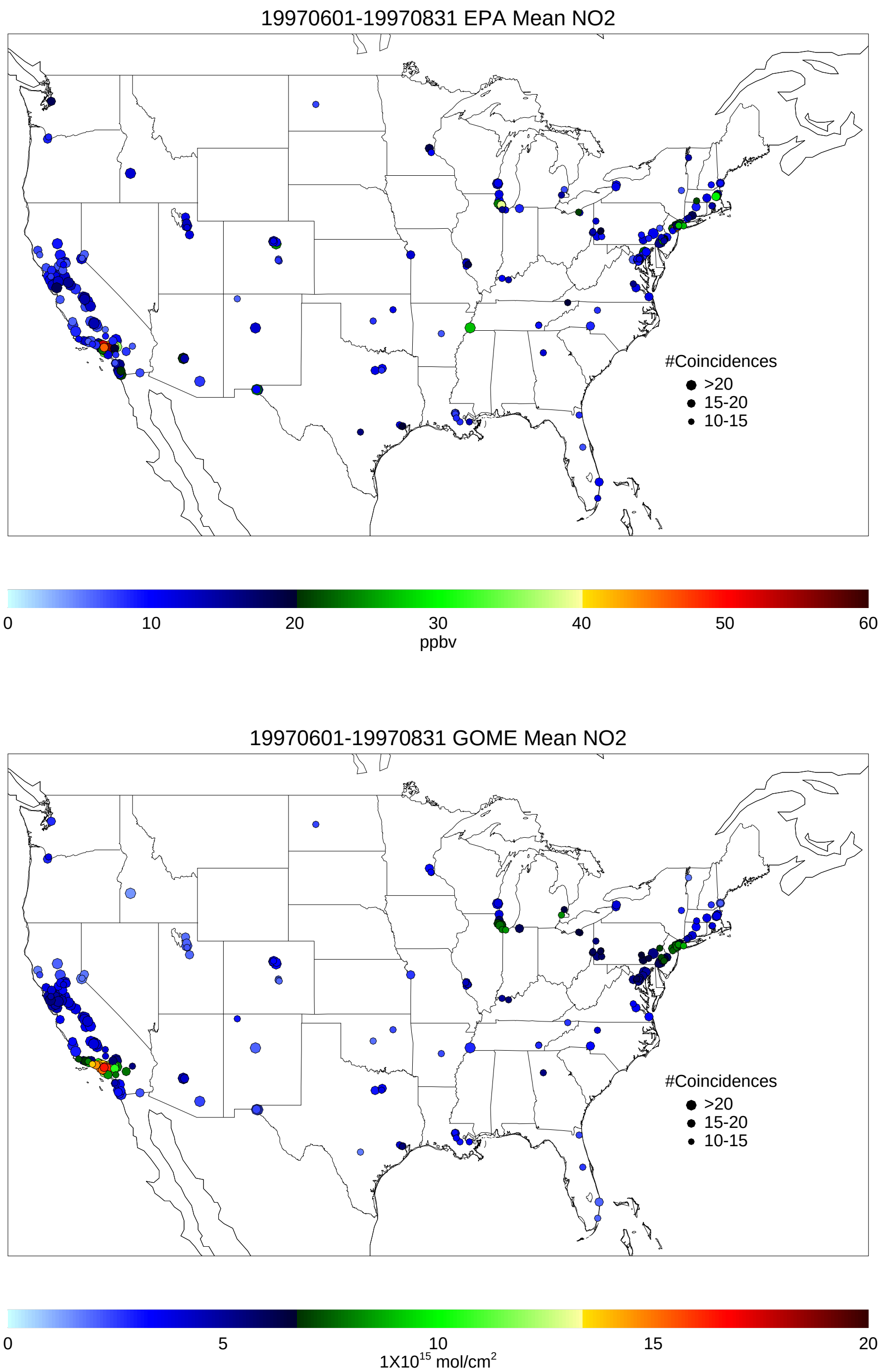
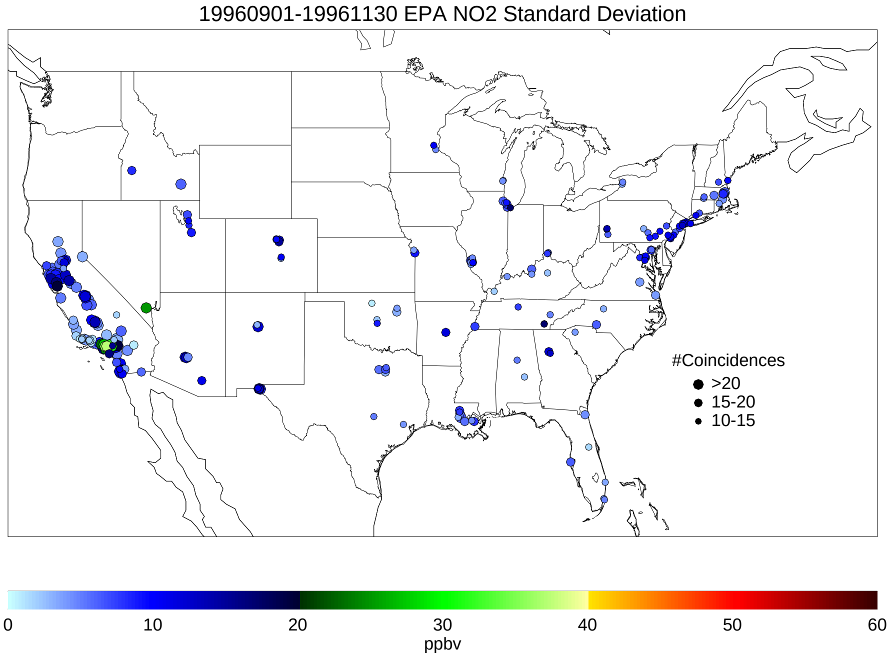


Figure 10: Site-by-site distribution of mean EPA surface NO_2 concentration (top) and GOME tropospheric column NO_2 (bottom) for summer 1997.



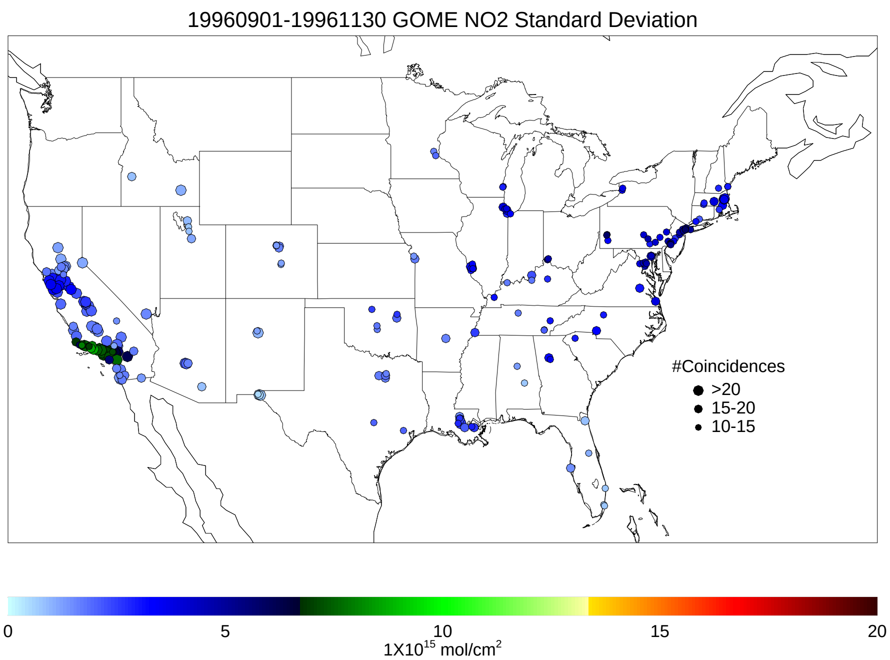
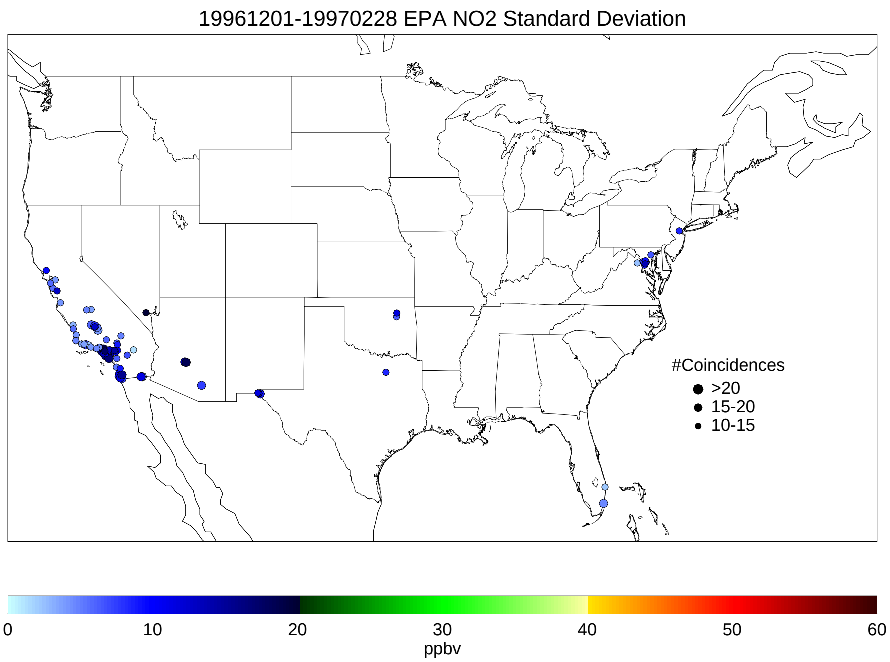


Figure 11: Site-by-site distribution of EPA surface NO_2 concentration (top) and GOME tropospheric column NO_2 (bottom) standard deviations for fall 1996.

EPA and GOME standard deviations are shown in Figures 12 on the following page, 13 on page 25, and 14 on page 26, respectively. Both EPA and GOME show an elevated standard deviation in southern California consistent with an elevated standard deviation in the 80 km binned GOME NO_2 (Figure 5 on page 14).



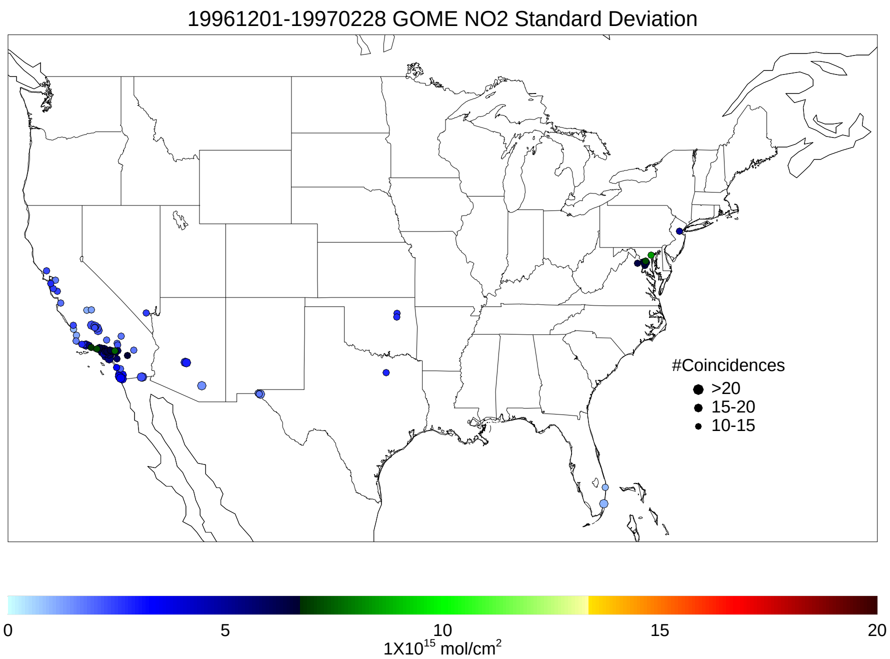
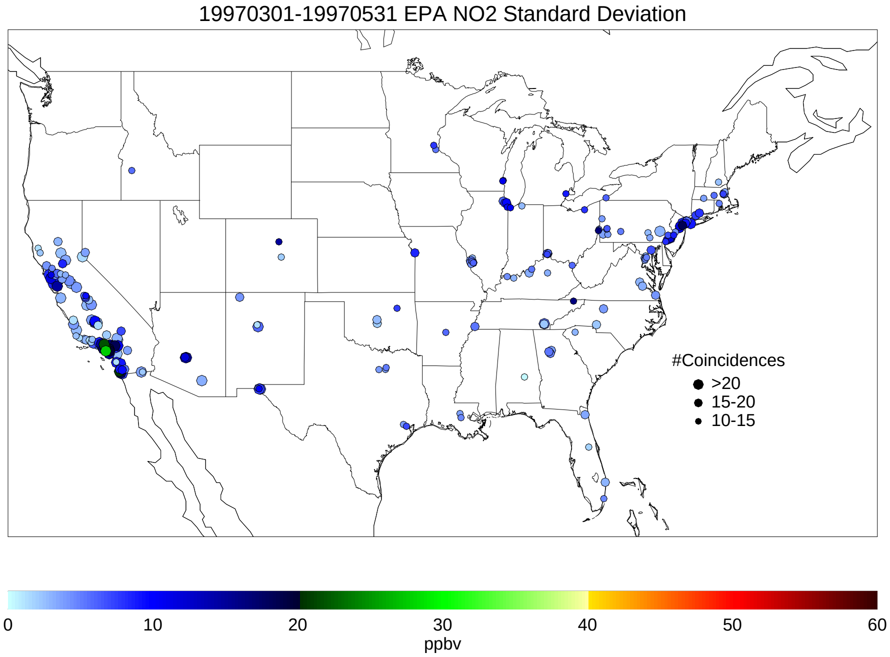


Figure 12: Site-by-site distribution of EPA surface NO_2 concentration (top) and GOME tropospheric column NO_2 (bottom) standard deviations for winter 1996-97.



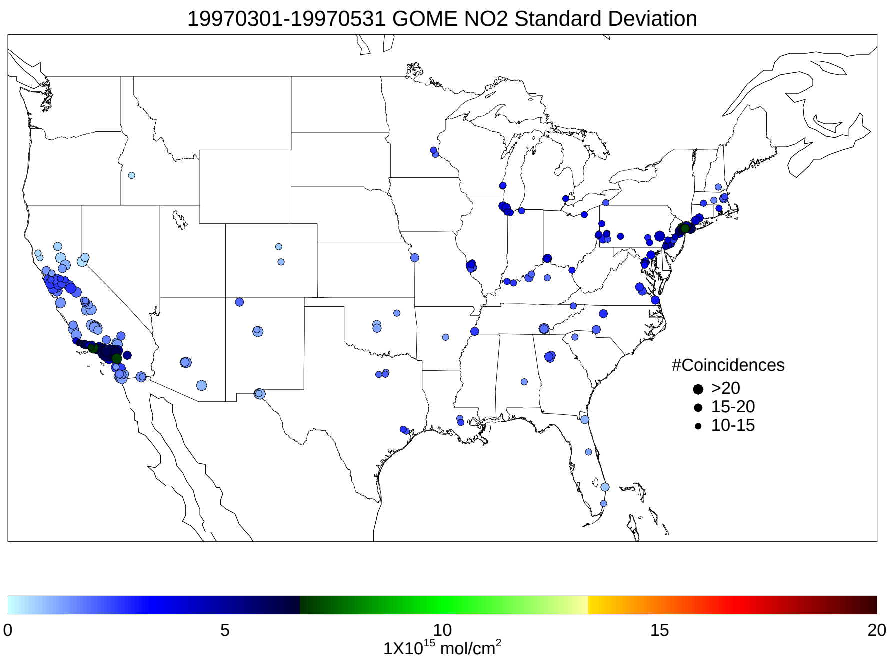
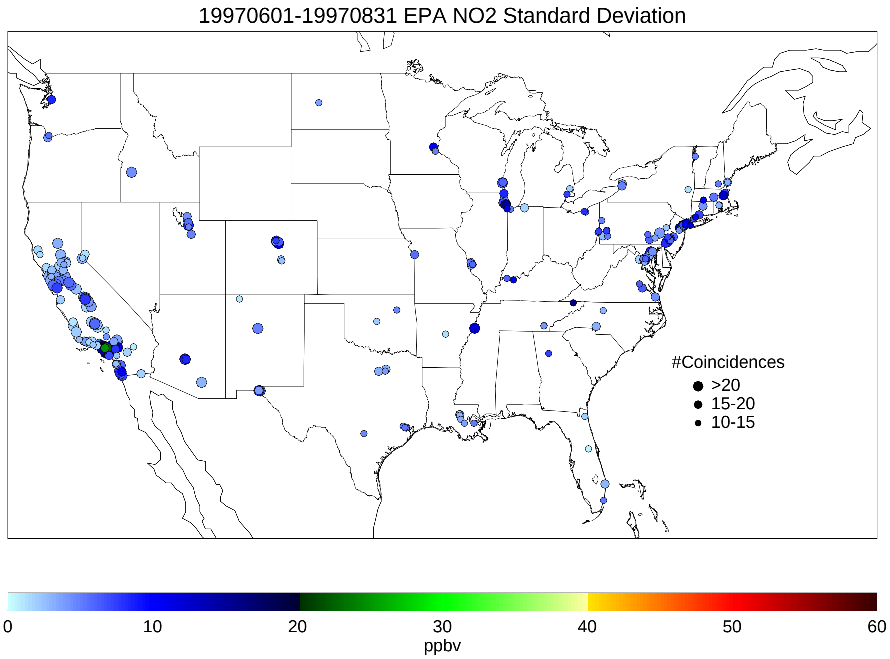


Figure 13: Site-by-site distribution of EPA surface NO_2 concentration (top) and GOME tropospheric column NO_2 (bottom) standard deviations for spring 1997.



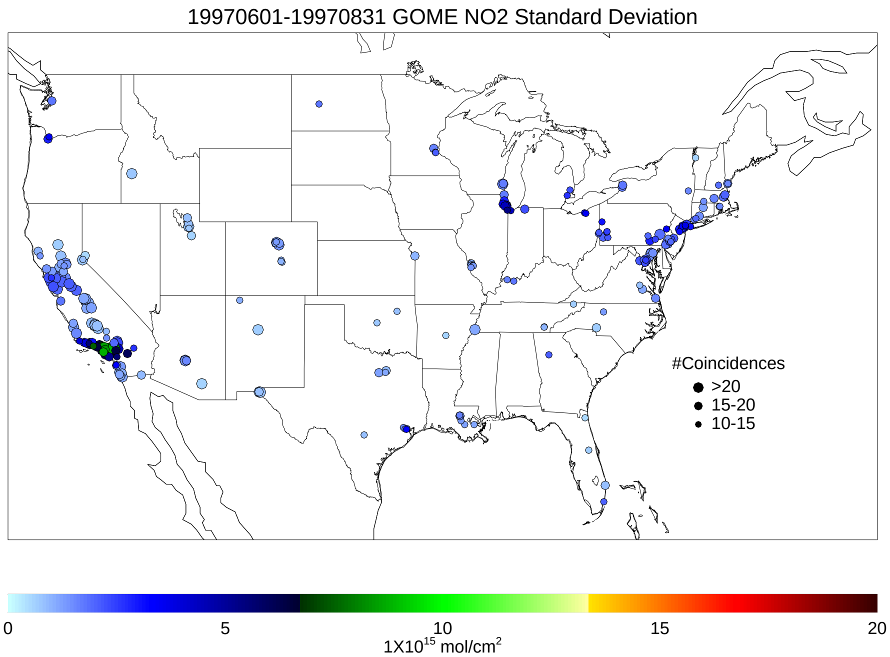


Figure 14: Site-by-site distribution of EPA surface NO_2 concentration (top) and GOME tropospheric column NO_2 (bottom) standard deviations for summer 1997.

4.3 Regional Spatial Statistics

The comparison of maps of EPA surface NO_2 concentration and GOME tropospheric column NO_2 density site-by-site mean and standard deviations show that GOME tropospheric column NO_2 density may provide useful qualitative information about the spatial distribution of mean surface NO_2 concentration from fall 1996 through summer 1997. However, there is significant site-to-site variation in the agreement between the mean EPA surface and GOME measurements. To quantify the spatial information content in the mean GOME measurements the correlations between the site-by-site means and standard deviations within each of the EPA regions are considered. Figure 15 shows a map of the EPA regions. Only continental US regions were considered in this analysis.

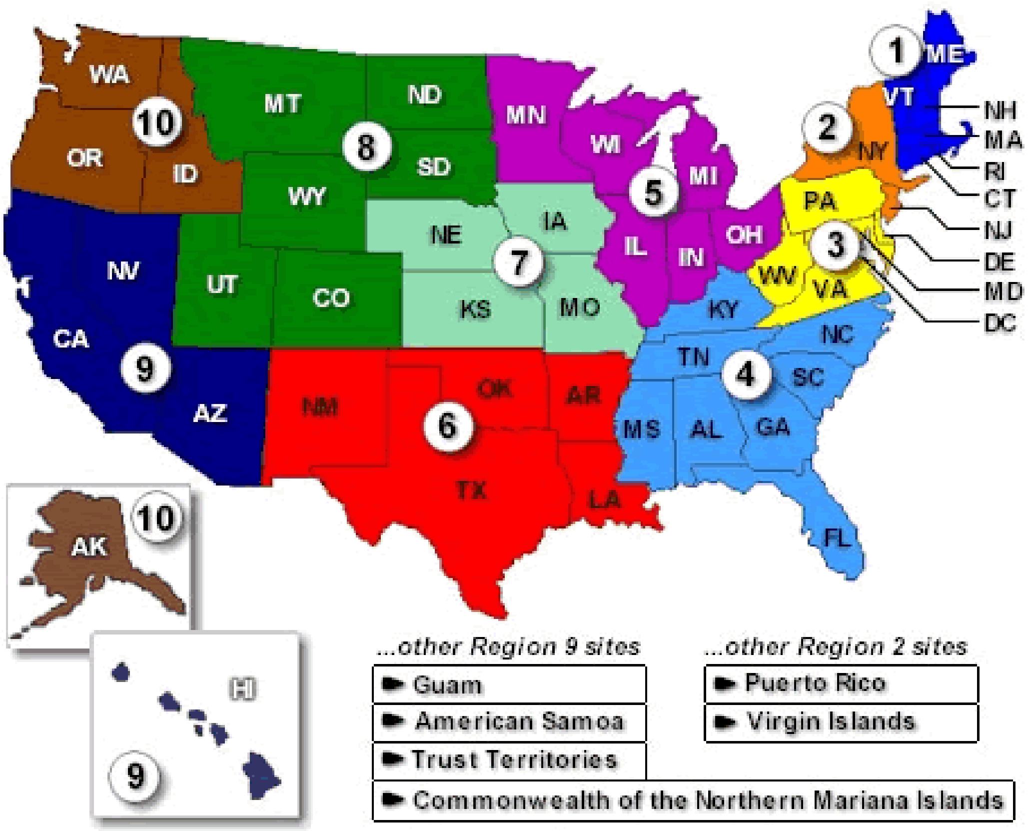


Figure 15: Map of EPA regions 1 through 10.

Figure 16 on the next page is an example of the spatial correlations between GOME tropospheric column NO_2 density and EPA surface NO_2 concentration and the means and standard deviations of GOME tropospheric column NO_2 density and EPA surface NO_2 concentration for each ground station within EPA region 2 during summer 1997. The data in the top panel depicts all the EPA/GOME coincident data pairs at every ground station in region 2 that had at least 10 coincidences and the correlation computed from those coincident pairs. The middle panel depicts coincident data averaged at each ground station (the number of crosses corresponds to the number of stations with at least 10 coincidences in that region) and the associated correlation. The bottom panel depicts the standard deviation at each ground station (with at least 10 coincidences) and the associated correlation. Appendix B on page 263 presents these spatial correlations for each EPA region for fall 1996,

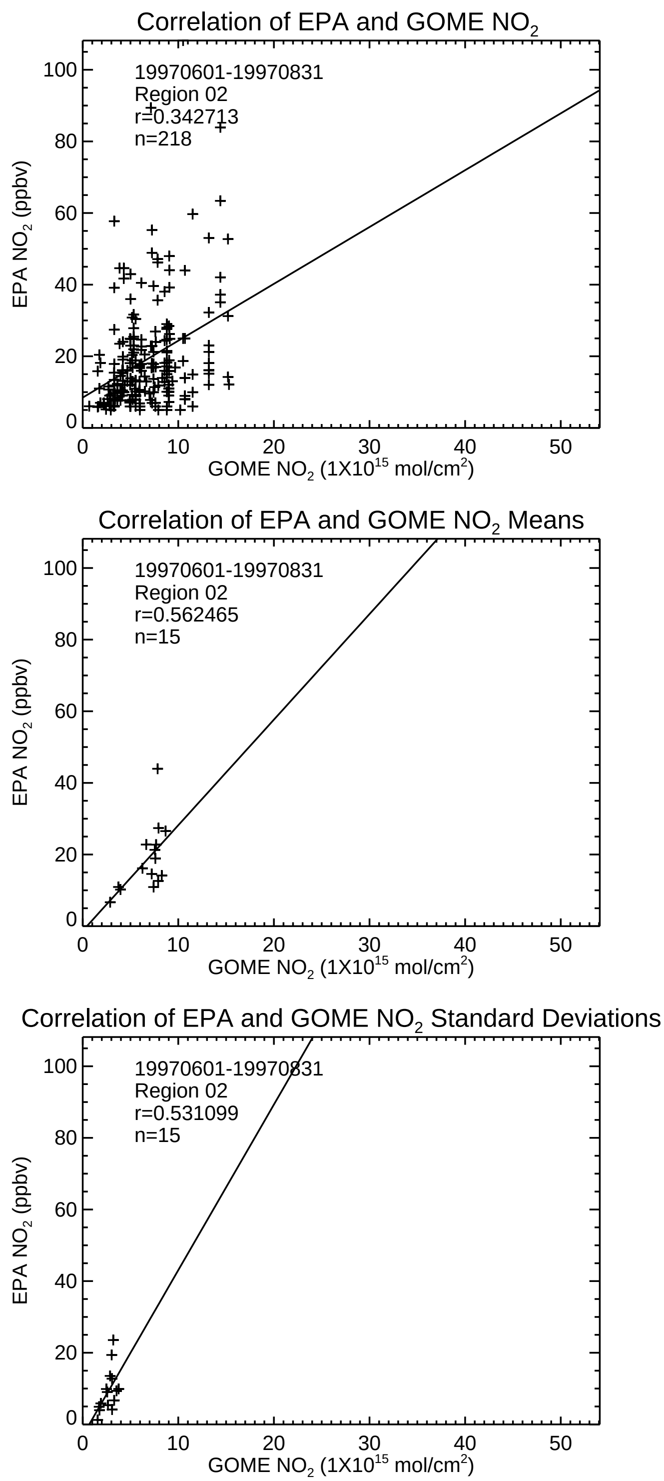


Figure 16: Spatial correlations between measurements, means, and standard deviations of GOME tropospheric column NO_2 and EPA surface NO_2 concentration for EPA region 2 during summer 1997.

winter 1996-97, spring 1997, and summer 1997 (provided sufficient data exists to compute the correlations). The spatial correlation between the GOME tropospheric column NO_2 density and the EPA surface NO_2 concentration within region 2 in the summer (top panel of Figure 16 on the preceding page is low (.34)). This value is consistent with the trend shown in summer histogram in Figure 3 on page 10. The spatial correlation between the site-by-site means (center panel of Figure 16 on the preceding page is higher (.56)). Site-by-site averaging within a region does not always result in an improved correlation, but every time the correlation does improve it is in a region with high urban activity. Site-by-site averaging improved the correlation in region 9 for every season.

Figure 17 on the following page through Figure 20 on page 33 are similar to Figure 16 on the facing page except that they contain the seasonal correlations for all the data in the contiguous United States. Grouping the data nationally increases the correlations, however the highest seasonal correlation of the coincident pairs (top panels) is still less than 0.5 (0.45). Averaging the coincident pairs at each station (center panels) increaseses the correlations further to a range of 0.47 to 0.64. When grouped this way, more data can be included in the calculations of correlations. For example, when segregated into regions during winter, only region 9 contained enough stations with sufficient winter data to calculate the correlations. Regions 7 and 10 did not have sufficient data during any season for a regional analysis, however, when grouped nationally, this data could be included.

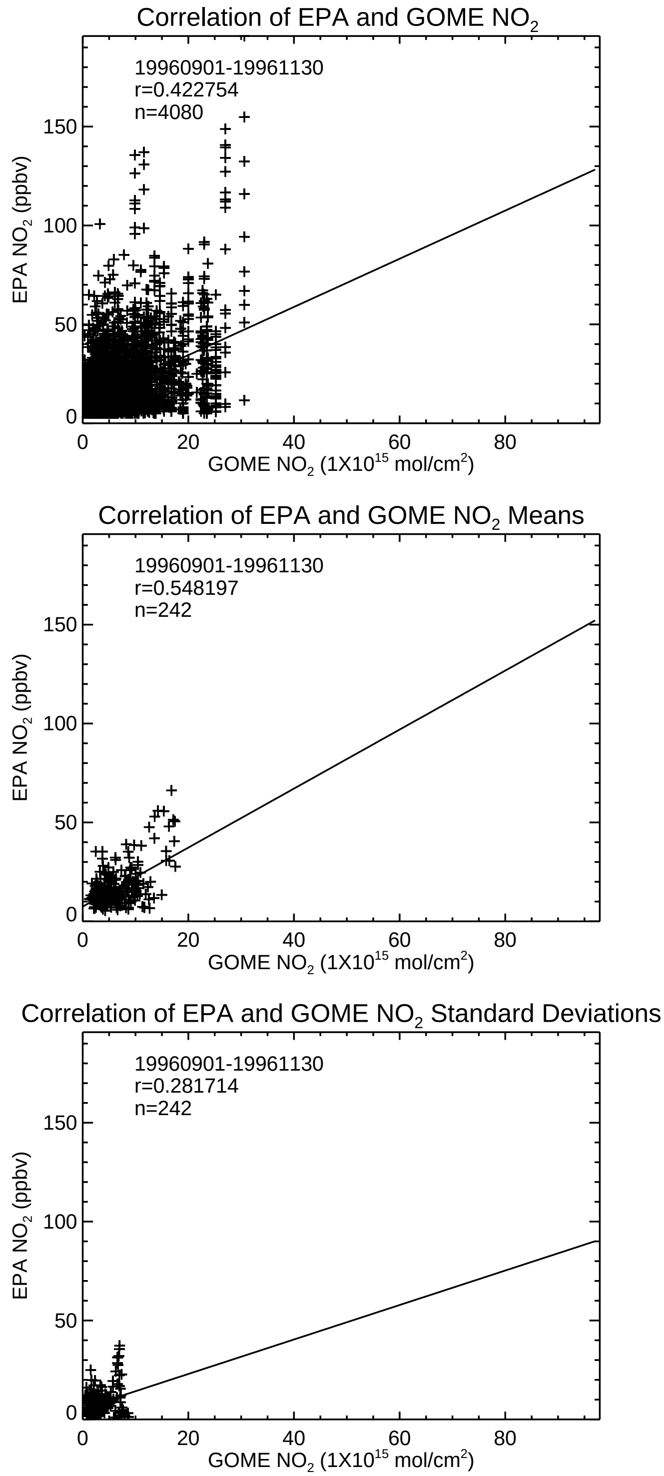


Figure 17: Spatial correlations between measurements, means, and standard deviations of GOME tropospheric column NO_2 and EPA surface NO_2 concentration for EPA the entire US during fall 1996.

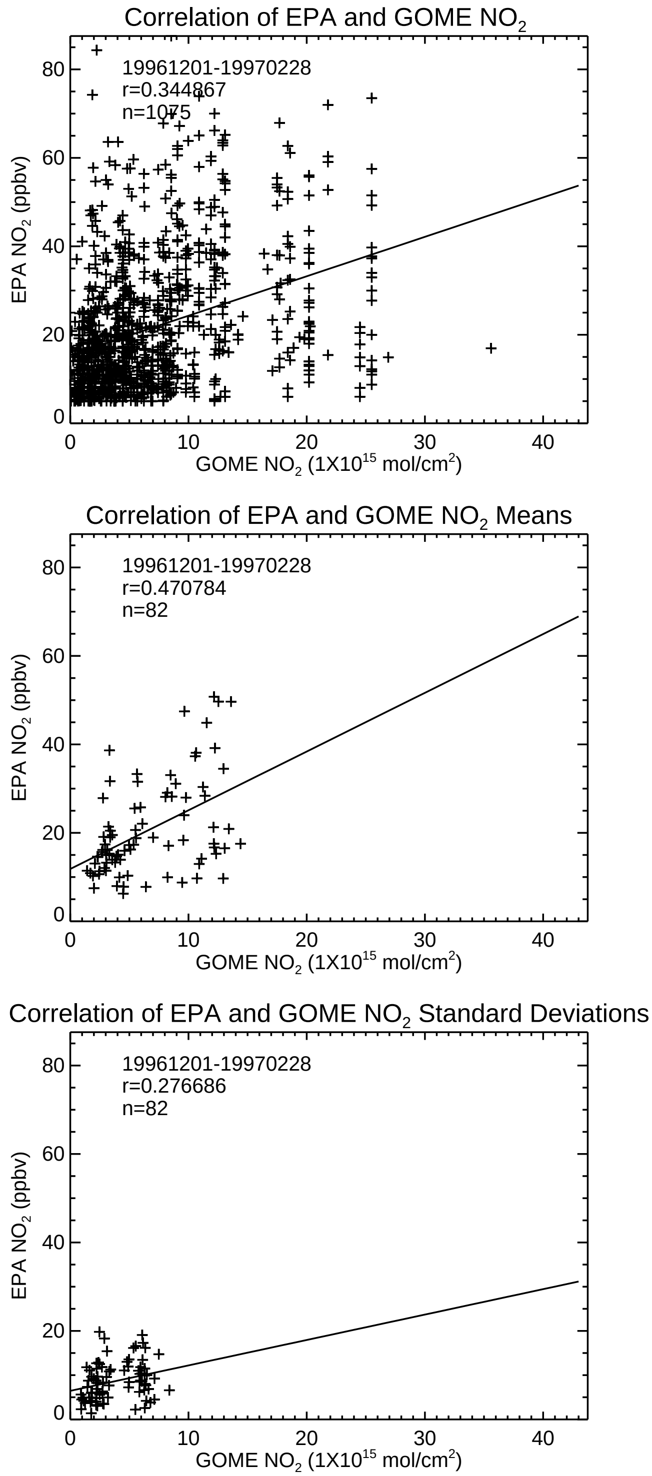


Figure 18: Spatial correlations between measurements, means, and standard deviations of GOME tropospheric column NO_2 and EPA surface NO_2 concentration for EPA the entire US during winter 1996-97.

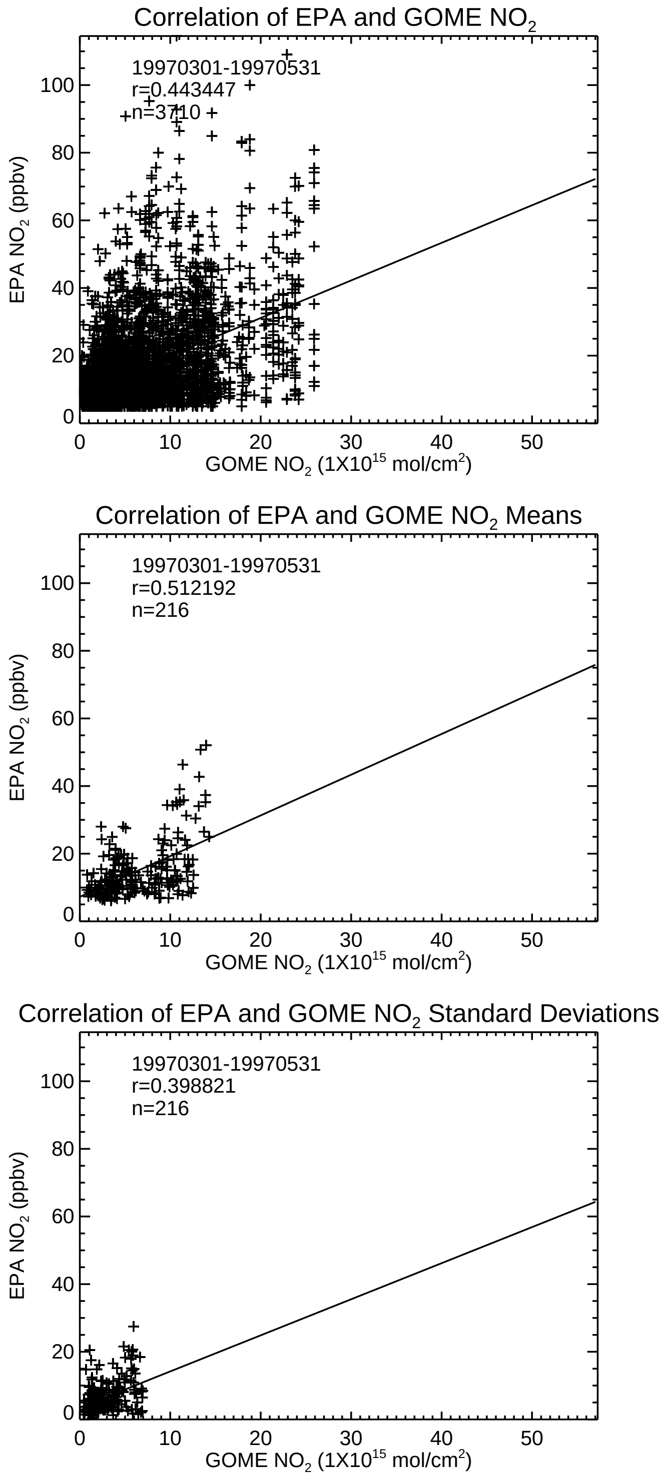


Figure 19: Spatial correlations between measurements, means, and standard deviations of GOME tropospheric column NO_2 and EPA surface NO_2 concentration for EPA the entire US during spring 1997.

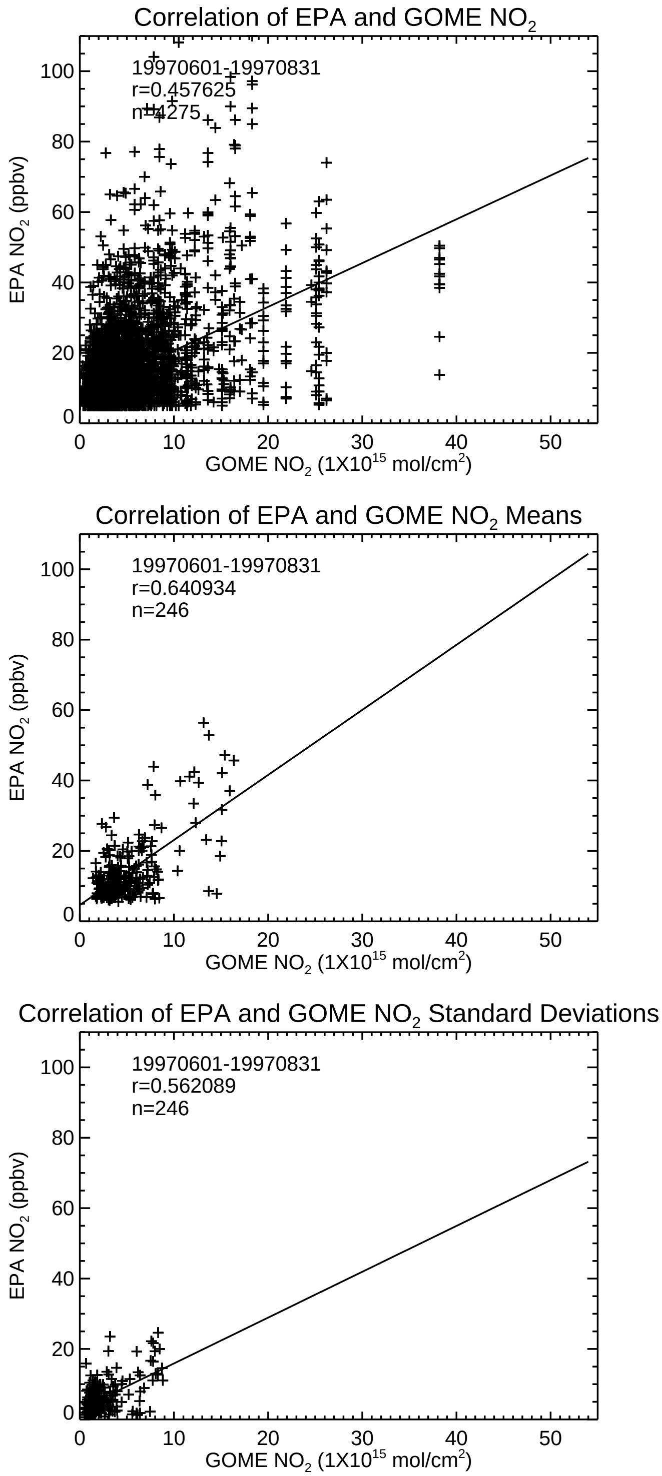


Figure 20: Spatial correlations between measurements, means, and standard deviations of GOME tropospheric column NO_2 and EPA surface NO_2 concentration for EPA the entire US during summer 1997.

5 Effect of Satellite Footprint Size on Correlation

Additional analysis was performed to investigate the effect the size of the GOME footprint has on the correlation between the EPA surface NO_2 concentration and the GOME tropospheric column NO_2 density. Hourly values of NO_2 emissions on a 20×20 km grid over the continental United States were obtained from the 1999 EPA emissions inventory. Two synthetic databases were created by using the EPA inventory as a proxy for the EPA surface measurements and the GOME retrievals for June, July, and August. To create the synthetic EPA data record, the emission value associated with the grid box the station is located inside is assigned to that station. This method was used to define hourly values for every station in the contiguous US. To determine the synthetic GOME value, emission values for all emission grid center points within a 1997 GOME footprint boundary were averaged. Due to the unavailability of emission data for the entire three month period, July data was repeated for each month. Neither the mismatch in year between the emission data and the GOME footprints or the use of only July emission data to define synthetic values for the entire summer impact the correlations calculated.

Figure 21 shows the correlations calculated at each ground station site for summer. This

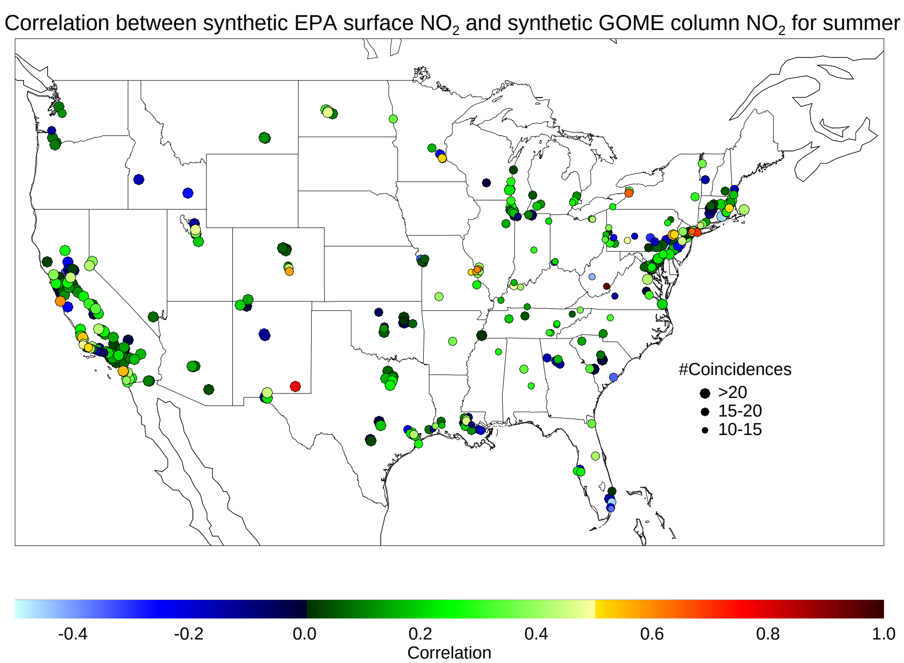


Figure 21: National summary plot of correlations between synthetic GOME values and synthetic EPA hourly data for June through August.

figure is analogous to Figure 2 on page 8 (summer). Since there were no data gaps in the synthetic ground station data or the synthetic GOME retrievals, a coincidence occurred for every GOME overpass for each ground station in the contiguous US. However, the correlations tend to be higher in Figure 2 on page 8 than in Figure 21 likely due to a bias introduced by not using a weighted average to calculate the synthetic GOME retrievals (for example, see California, Texas, the Chicago area, and the Northeast). After artificially reducing the size of the GOME footprint to $0.1° \times 0.1°$ about the center point, five coincidences resulted. The coincident synthetic EPA and GOME values were within 0.5% for three of the stations

and within 4.3% and 5.3% for the remaining two stations. In general,this analysis indicates the GOME footprint is too large to get meaningful comparisons with the ground station data. Other studies have shown that in some instances the GOME resolution can be increased in certain ways to compensate for the large footprint and better correlations with in-situ measurements can be achieved [19], [20].

6 Conclusion

This technical evaluation of the relationship between EPA surface NO_2 concentration and satellite-observed tropospheric NO_2 column density during the period from September 1996 through August 1997 indicates that the GOME data do not represent the distribution of surface NO_2 as observed by the EPA regulatory network. GOME resolution is insufficient to resolve the variability (spatially and temporally) indicated in the ground station data and illustrated in this analysis using synthetic EPA and GOME values. In addition, the GOME (10:30 local) overpass occurs during a time of rapid change in tropospheric NO_2 as NO_x begins to repartition into NO and NO_2. The coarse spatial resolution of GOME, the GOME morning overpass design, and GOME's insufficient sampling frequency for a photochemically active constituent, do not contribute meaningful data for the distribution of NO_2 in the lower atmosphere.

The tools and processes developed to conduct this study will be applied to the analysis of OMI NO_2 observations in the near future. OMI has significantly better spatial resolution than GOME; 39 OMI data points exist within one GOME footprint. OMI also operates with an afternoon (13:30 local) overpass time, providing a more representative NO2 distribution for once-per-day sampling. We expect substantially better correlation between OMI NO_2 and surface observations of NO_2.

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A Site-by-Site Satellite and EPA In-Situ Time Series

This appendix contains Table 1, which begins on the next page, and the site-by-site satellite and in-situ time series plots for all of the ground stations used in this analysis, which begin on page 49.

Table 1 lists the pertinent information (EPA region, station ID, state, county, longitude, latitude, fall, winter, spring, summer, MSA number, and MSA description) for the ground station sites, organized by EPA region. For each station a check in a season column indicates the presence of a time series plot for that season. The absence of a check indicates that there were not at least ten coincidences for that season and thus no time series plot was produced (indicated with the "Insufficient Coincident Data" panel). The time series plots are listed in the same order as the stations in Table 1. From left to right, the panels show fall and winter in the first row and spring and summer in the second row.

Table 1: United States EPA Ground Station Sites, Averaged by MSA.

Region	Station ID	State	County	Lon	Lat	F	W	Sp	Su	MSA	MSA Description
1	090010113-1	CT	Fairfield	-73.19	41.18	✓		✓	✓	1160	Bridgeport, CT
1	090019003-1	CT	Fairfield	-73.34	41.12				✓	1160	Bridgeport, CT
1	090031003-1	CT	Hartford	-72.63	41.78				✓	3280	Hartford, CT
1	090091123-1	CT	New Haven	-72.92	41.31	✓		✓	✓	1160	Bridgeport, CT
1	250051005-1	MA	Bristol	-71.15	42.06	✓				6480	Providence-Fall River-Warwick, RI-MA
1	250092006-1	MA	Essex	-70.97	42.47	✓		✓	✓	1120	Boston, MA-NH
1	250130008-1	MA	Hampden	-72.56	42.19	✓				8000	Springfield, MA
1	250130016-1	MA	Hampden	-72.59	42.11	✓		✓	✓	8000	Springfield, MA
1	250250002-1	MA	Suffolk	-71.10	42.35	✓		✓	✓	1120	Boston, MA-NH
1	250250021-1	MA	Suffolk	-71.03	42.38	✓		✓	✓	1120	Boston, MA-NH
1	250250040-1	MA	Suffolk	-71.04	42.35	✓		✓	✓	1120	Boston, MA-NH
1	250251003-1	MA	Suffolk	-71.03	42.40	✓		✓	✓	1120	Boston, MA-NH
1	250270020-1	MA	Worcester	-71.80	42.27	✓		✓	✓	-	(not in an MSA)
1	230313002-1	ME	York	-70.75	43.08	✓			✓	-	(not in an MSA)
1	330110016-1	NH	Hillsborough	-71.46	42.99	✓		✓	✓	5350	Nashua, NH
1	330150009-1	NH	Rockingham	-70.76	43.08	✓			✓	6450	Portsmouth-Rochester, NH-ME
1	440070012-2	RI	Providence	-71.41	41.83	✓		✓	✓	6480	Providence-Fall River-Warwick, RI-MA
1	440071010-1	RI	Providence	-71.36	41.84				✓	6480	Providence-Fall River-Warwick, RI-MA
1	500070003-1	VT	Chittenden	-73.21	44.48				✓	1305	Burlington, VT
2	340030001-1	NJ	Bergen	-73.99	40.81	✓		✓	✓	0875	Bergen-Passaic, NJ
2	340070003-2	NJ	Camden	-75.10	39.92	✓		✓	✓	6160	Philadelphia, PA-NJ
2	340130011-1	NJ	Essex	-74.14	40.73	✓		✓	✓	5640	Newark, NJ
2	340131003-1	NJ	Essex	-74.20	40.76	✓		✓	✓	5640	Newark, NJ
2	340170006-1	NJ	Hudson	-74.13	40.67	✓		✓	✓	3640	Jersey City, NJ
2	340210005-1	NJ	Mercer	-74.75	40.28	✓		✓		8480	Trenton, NJ
2	340230011-1	NJ	Middlesex	-74.43	40.47	✓		✓	✓	5015	Middlesex-Somerset-Hunterdon, NJ
2	340390004-2	NJ	Union	-74.21	40.64	✓		✓	✓	5640	Newark, NJ
2	340390008-1	NJ	Union	-74.44	40.60	✓	✓	✓	✓	5640	Newark, NJ
2	360010012-1	NY	Albany	-73.76	42.68				✓	0160	Albany-Schenectady-Troy, NY
2	360050080-1	NY	Bronx	-73.92	40.84	✓		✓	✓	5600	New York, NY
2	360050083-1	NY	Bronx	-73.88	40.87			✓	✓	5600	New York, NY
2	360290002-1	NY	Erie	-78.77	42.99	✓			✓	1280	Buffalo-Niagara Falls, NY

Table 1: Continued.

Region	Station ID	State	County	Lon	Lat	F	W	Sp	Su	MSA	MSA Description
2	360290005-3	NY	Erie	-78.81	42.88	✓			✓	1280	Buffalo-Niagara Falls, NY
2	360590005-2	NY	Nassau	-73.59	40.74	✓		✓	✓	5380	Nassau-Suffolk, NY
2	360610010-1	NY	New York	-73.99	40.74	✓		✓		5600	New York, NY
2	360610056-1	NY	New York	-73.97	40.76	✓		✓	✓	5600	New York, NY
3	110010025-1	DC	District of Col	-77.02	38.98	✓	✓	✓	✓	8840	Washington, DC-MD-VA-WV
3	110010041-1	DC	District of Col	-76.95	38.90	✓	✓	✓	✓	8840	Washington, DC-MD-VA-WV
3	110010043-1	DC	District of Col	-77.01	38.92				✓	8840	Washington, DC-MD-VA-WV
3	100031003-1	DE	New Castle	-75.49	39.76			✓	✓	9160	Wilmington-Newark, DE-MD
3	240030019-3	MD	Anne Arundel	-76.73	39.10				✓	0720	Baltimore, MD
3	240053001-2	MD	Baltimore	-76.47	39.31				✓	0720	Baltimore, MD
3	245100040-1	MD	Baltimore City	-76.60	39.30	✓	✓	✓	✓	0720	Baltimore, MD
3	245100050-1	MD	Baltimore City	-76.58	39.32	✓				0720	Baltimore, MD
3	245100051-1	MD	Baltimore City	-76.60	39.28				✓	0720	Baltimore, MD
3	420030008-1	PA	Allegheny	-79.96	40.47	✓		✓	✓	6280	Pittsburgh, PA
3	420030031-1	PA	Allegheny	-79.99	40.44	✓		✓	✓	6280	Pittsburgh, PA
3	420110009-1	PA	Berks	-75.93	40.32	✓		✓	✓	6680	Reading, PA
3	420170012-1	PA	Bucks	-74.88	40.11	✓		✓	✓	6160	Philadelphia, PA-NJ
3	420210011-1	PA	Cambria	-78.92	40.31			✓		3680	Johnstown, PA
3	420430401-1	PA	Dauphin	-76.84	40.25	✓		✓	✓	3240	Harrisburg-Lebanon-Carlisle, PA
3	420450002-1	PA	Delaware	-75.37	39.84			✓	✓	6160	Philadelphia, PA-NJ
3	420490003-1	PA	Erie	-80.04	42.14			✓		2360	Erie, PA
3	420710007-1	PA	Lancaster	-76.28	40.05	✓			✓	4000	Lancaster, PA
3	420730015-1	PA	Lawrence	-80.35	41.00			✓	✓	-	(not in an MSA)
3	420770004-1	PA	Lehigh	-75.43	40.61	✓			✓	0240	Allentown-Bethlehem-Easton, PA
3	420910013-1	PA	Montgomery	-75.31	40.11	✓		✓	✓	6160	Philadelphia, PA-NJ
3	420990301-1	PA	Perry	-77.17	40.46	✓				3240	Harrisburg-Lebanon-Carlisle, PA
3	421010004-3	PA	Philadelphia	-75.10	40.01	✓		✓	✓	6160	Philadelphia, PA-NJ
3	421010029-2	PA	Philadelphia	-75.17	39.96	✓		✓	✓	6160	Philadelphia, PA-NJ
3	421010047-1	PA	Philadelphia	-75.17	39.94	✓		✓	✓	6160	Philadelphia, PA-NJ
3	421250005-1	PA	Washington	-79.90	40.15	✓		✓	✓	6280	Pittsburgh, PA
3	421250200-1	PA	Washington	-80.26	40.17			✓	✓	6280	Pittsburgh, PA
3	421330008-1	PA	York	-76.70	39.97	✓		✓	✓	9280	York, PA

Table 1: Continued.

Region	Station ID	State	County	Lon	Lat	F	W	Sp	Su	MSA	MSA Description
3	510130020-1	VA	Arlington	-77.06	38.86	✓		✓	✓	8840	Washington, DC-MD-VA-WV
3	510360002-1	VA	Charles City	-77.26	37.34			✓	✓	6760	Richmond-Petersburg, VA
3	510590005-1	VA	Fairfax	-77.47	38.89	✓			✓	8840	Washington, DC-MD-VA-WV
3	510590018-1	VA	Fairfax	-77.08	38.74	✓	✓	✓	✓	8840	Washington, DC-MD-VA-WV
3	510591004-3	VA	Fairfax	-77.14	38.87	✓	✓	✓	✓	8840	Washington, DC-MD-VA-WV
3	510595001-1	VA	Fairfax	-77.20	38.93	✓	✓		✓	8840	Washington, DC-MD-VA-WV
3	511530009-1	VA	Prince William	-77.64	38.86		✓			8840	Washington, DC-MD-VA-WV
3	515100009-3	VA	Alexandria City	-77.04	38.81	✓	✓	✓	✓	8840	Washington, DC-MD-VA-WV
3	517100023-1	VA	Norfolk City	-76.26	36.85	✓		✓	✓	5720	Norfolk-Virginia Beach-Newport News, VA-NC
3	517600021-1	VA	Richmond City	-77.47	37.56	✓		✓	✓	6760	Richmond-Petersburg, VA
3	540291004-1	WV	Hancock	-80.58	40.42			✓	✓	8080	Steubenville-Weirton, OH-WV
4	011011002-1	AL	Montgomery	-86.26	32.41	✓		✓		5240	Montgomery, AL
4	011170004-1	AL	Shelby	-86.83	33.32	✓				1000	Birmingham, AL
4	120250027-1	FL	Dade	-80.16	25.74	✓				5000	Miami, FL
4	120254002-2	FL	Dade	-80.21	25.80	✓	✓	✓	✓	5000	Miami, FL
4	120310032-2	FL	Duval	-81.64	30.36	✓		✓	✓	3600	Jacksonville, FL
4	120952002-1	FL	Orange	-81.36	28.60	✓		✓	✓	5960	Orlando, FL
4	120991004-1	FL	Palm Beach	-80.10	26.69	✓	✓	✓	✓	8960	West Palm Beach-Boca Raton, FL
4	121030018-1	FL	Pinellas	-82.74	27.79	✓				8280	Tampa-St. Petersburg-Clearwater, FL
4	130890002-1	GA	DeKalb	-84.29	33.69	✓		✓		0520	Atlanta, GA
4	130893001-1	GA	DeKalb	-84.21	33.85			✓		0520	Atlanta, GA
4	131210048-1	GA	Fulton	-84.40	33.78	✓		✓	✓	0520	Atlanta, GA
4	210190015-1	KY	Boyd	-82.62	38.47			✓		3400	Huntington-Ashland, WV-KY-OH
4	210290006-1	KY	Bullitt	-85.71	37.99	✓				4520	Louisville, KY-IN
4	210371001-1	KY	Campbell	-84.48	39.11	✓		✓		1640	Cincinnati, OH-KY-IN
4	210590005-1	KY	Daviess	-87.08	37.78			✓	✓	5990	Owensboro, KY
4	210670012-1	KY	Fayette	-84.50	38.07	✓		✓		4280	Lexington, KY
4	211010013-1	KY	Henderson	-87.58	37.86	✓		✓	✓	2440	Evansville-Henderson, IN-KY
4	211110051-1	KY	Jefferson	-85.90	38.06			✓		4520	Louisville, KY-IN
4	211111021-2	KY	Jefferson	-85.71	38.26	✓		✓		4520	Louisville, KY-IN
4	211170007-2	KY	Kenton	-84.53	39.07			✓		1640	Cincinnati, OH-KY-IN
4	211451024-1	KY	McCracken	-88.57	37.06	✓				-	(not in an MSA)

Table 1: Continued.

Region	Station ID	State	County	Lon	Lat	F	W	Sp	Su	MSA	MSA Description
4	370670022-1	NC	Forsyth	-80.23	36.11	✓		✓	✓	3120	Greensboro–Winston-Salem–High Point, NC
4	371190034-1	NC	Mecklenburg	-80.77	35.25	✓		✓	✓	1520	Charlotte-Gastonia-Rock Hill, NC-SC
4	450450008-1	SC	Greenville	-82.40	34.84	✓		✓		3160	Greenville-Spartanburg-Anderson, SC
4	470110102-1	TN	Bradley	-84.76	35.28	✓		✓	✓	-	(not in an MSA)
4	470370011-1	TN	Davidson	-86.74	36.21	✓				5360	Nashville, TN
4	471050003-1	TN	Loudon	-84.30	35.79	✓				3840	Knoxville, TN
4	471070101-1	TN	McMinn	-84.75	35.30	✓		✓	✓	-	(not in an MSA)
4	471570024-1	TN	Shelby	-90.04	35.15	✓		✓	✓	4920	Memphis, TN-AR-MS
4	471630007-1	TN	Sullivan	-82.52	36.53			✓	✓	3660	Johnson City-Kingsport-Bristol, TN-VA
5	170310063-1	IL	Cook	-87.63	41.88	✓		✓	✓	1600	Chicago, IL
5	170310064-1	IL	Cook	-87.60	41.79	✓		✓	✓	1600	Chicago, IL
5	170310072-1	IL	Cook	-87.61	41.90				✓	1600	Chicago, IL
5	170313101-1	IL	Cook	-87.89	41.96	✓		✓	✓	1600	Chicago, IL
5	170314002-1	IL	Cook	-87.75	41.86	✓		✓	✓	1600	Chicago, IL
5	170314201-1	IL	Cook	-87.80	42.14				✓	1600	Chicago, IL
5	170318003-1	IL	Cook	-87.57	41.63	✓		✓	✓	1600	Chicago, IL
5	170971007-1	IL	Lake	-87.81	42.47				✓	1600	Chicago, IL
5	171630010-2	IL	St Clair	-90.16	38.61	✓		✓	✓	7040	St. Louis, MO-IL
5	180890022-1	IN	Lake	-87.30	41.61				✓	2960	Gary, IN
5	180891016-2	IN	Lake	-87.33	41.60	✓		✓		2960	Gary, IN
5	181410012-1	IN	St Joseph	-86.46	41.70			✓		7800	South Bend, IN
5	181411008-1	IN	St Joseph	-86.24	41.69				✓	7800	South Bend, IN
5	260990009-1	MI	Macomb	-82.79	42.73				✓	2160	Detroit, MI
5	261630016-1	MI	Wayne	-83.10	42.36			✓		2160	Detroit, MI
5	261630019-2	MI	Wayne	-83.00	42.43				✓	2160	Detroit, MI
5	270370020-1	MN	Dakota	-93.03	44.76	✓		✓	✓	5120	Minneapolis-St. Paul, MN-WI
5	270370423-1	MN	Dakota	-93.06	44.78				✓	5120	Minneapolis-St. Paul, MN-WI
5	271230864-1	MN	Ramsey	-93.18	44.99	✓		✓	✓	5120	Minneapolis-St. Paul, MN-WI
5	390350060-1	OH	Cuyahoga	-81.68	41.49			✓	✓	1680	Cleveland-Lorain-Elyria, OH
5	390350066-1	OH	Cuyahoga	-81.58	41.46				✓	1680	Cleveland-Lorain-Elyria, OH
5	390610037-1	OH	Hamilton	-84.52	39.11	✓		✓		1640	Cincinnati, OH-KY-IN
5	390614002-1	OH	Hamilton	-84.44	39.16	✓		✓		1640	Cincinnati, OH-KY-IN

Table 1: Continued.

Region	Station ID	State	County	Lon	Lat	F	W	Sp	Su	MSA	MSA Description
5	390811012-2	OH	Jefferson	-80.62	40.36			✓	✓	8080	Steubenville-Weirton, OH-WV
5	550790007-1	WI	Milwaukee	-87.92	43.05	✓		✓	✓	5080	Milwaukee-Waukesha, WI
5	550790041-1	WI	Milwaukee	-87.88	43.08	✓		✓	✓	5080	Milwaukee-Waukesha, WI
6	051191002-1	AR	Pulaski	-92.26	34.83	✓		✓	✓	4400	Little Rock-North Little Rock, AR
6	220330003-1	LA	East Baton Roug	-91.18	30.42	✓		✓	✓	0760	Baton Rouge, LA
6	220330009-1	LA	East Baton Roug	-91.18	30.46	✓			✓	0760	Baton Rouge, LA
6	220331001-1	LA	East Baton Roug	-91.21	30.59	✓				0760	Baton Rouge, LA
6	220470002-1	LA	Iberville	-91.10	30.20	✓		✓	✓	-	(not in an MSA)
6	220470009-1	LA	Iberville	-91.32	30.22	✓				-	(not in an MSA)
6	220511001-1	LA	Jefferson	-90.28	30.04	✓				5560	New Orleans, LA
6	220710012-1	LA	Orleans	-90.10	29.99	✓			✓	5560	New Orleans, LA
6	220930002-1	LA	St James	-90.82	29.99	✓			✓	5560	New Orleans, LA
6	221210001-1	LA	West Baton Roug	-91.21	30.50	✓			✓	0760	Baton Rouge, LA
6	350010023-1	NM	Bernalillo	-106.58	35.14	✓		✓	✓	0200	Albuquerque, NM
6	350130021-1	NM	Dona Ana	-106.58	31.80	✓	✓	✓		4100	Las Cruces, NM
6	350431003-1	NM	Sandoval	-106.65	35.24	✓		✓		0200	Albuquerque, NM
6	350450009-1	NM	San Juan	-107.98	36.74			✓	✓	-	(not in an MSA)
6	400270049-1	OK	Cleveland	-97.49	35.32	✓		✓		5880	Oklahoma City, OK
6	400470552-1	OK	Garfield	-97.90	36.41	✓				2340	Enid, OK
6	401090033-1	OK	Oklahoma	-97.51	35.52	✓		✓	✓	5880	Oklahoma City, OK
6	401430174-1	OK	Tulsa	-96.00	35.94	✓	✓			8560	Tulsa, OK
6	401430191-1	OK	Tulsa	-95.98	36.14	✓	✓	✓	✓	8560	Tulsa, OK
6	480290046-1	TX	Bexar	-98.49	29.43				✓	7240	San Antonio, TX
6	481130045-1	TX	Dallas	-96.81	32.92	✓	✓	✓	✓	1920	Dallas, TX
6	481130069-2	TX	Dallas	-96.86	32.82	✓		✓	✓	1920	Dallas, TX
6	481130087-1	TX	Dallas	-96.87	32.68	✓				1920	Dallas, TX
6	481410027-1	TX	El Paso	-106.49	31.76	✓	✓	✓	✓	2320	El Paso, TX
6	481410028-1	TX	El Paso	-106.40	31.75	✓	✓	✓	✓	2320	El Paso, TX
6	481410037-1	TX	El Paso	-106.50	31.77	✓	✓	✓	✓	2320	El Paso, TX
6	482010047-1	TX	Harris	-95.49	29.83	✓		✓	✓	3360	Houston, TX
6	482011034-1	TX	Harris	-95.22	29.77				✓	3360	Houston, TX
6	482011035-1	TX	Harris	-95.26	29.73			✓	✓	3360	Houston, TX

Table 1: Continued.

Region	Station ID	State	County	Lon	Lat	F	W	Sp	Su	MSA	MSA Description
6	482011037-1	TX	Harris	-95.36	29.75				✓	3360	Houston, TX
6	484391002-1	TX	Tarrant	-97.36	32.81	✓		✓	✓	2800	Fort Worth-Arlington, TX
6	484530017-1	TX	Travis	-97.75	30.26	✓				0640	Austin-San Marcos, TX
7	202090020-1	KS	Wyandotte	-94.62	39.15	✓		✓	✓	3760	Kansas City, MO-KS
7	291650023-1	MO	Platte	-94.70	39.30	✓				3760	Kansas City, MO-KS
7	291831002-1	MO	St Charles	-90.23	38.87	✓		✓		7040	St. Louis, MO-IL
7	291890001-2	MO	St Louis	-90.34	38.52	✓		✓	✓	7040	St. Louis, MO-IL
7	291893001-2	MO	St Louis	-90.35	38.64	✓		✓	✓	7040	St. Louis, MO-IL
7	291895001-1	MO	St Louis	-90.29	38.77	✓		✓	✓	7040	St. Louis, MO-IL
7	291897002-2	MO	St Louis	-90.38	38.73	✓		✓	✓	7040	St. Louis, MO-IL
7	295100072-2	MO	St Louis City	-90.20	38.62	✓		✓	✓	7040	St. Louis, MO-IL
7	295100080-1	MO	St Louis City	-90.25	38.68	✓		✓	✓	7040	St. Louis, MO-IL
8	080013001-1	CO	Adams	-104.95	39.84	✓			✓	2080	Denver, CO
8	080310002-1	CO	Denver	-104.99	39.75	✓		✓	✓	2080	Denver, CO
8	080416001-1	CO	El Paso	-104.72	38.63				✓	1720	Colorado Springs, CO
8	080416004-1	CO	El Paso	-104.81	38.92	✓		✓		1720	Colorado Springs, CO
8	080416011-1	CO	El Paso	-104.83	38.85	✓			✓	1720	Colorado Springs, CO
8	080416018-1	CO	El Paso	-104.75	38.81				✓	1720	Colorado Springs, CO
8	080590006-1	CO	Jefferson	-105.19	39.91	✓			✓	2080	Denver, CO
8	080590008-1	CO	Jefferson	-105.17	39.88	✓			✓	2080	Denver, CO
8	080590009-1	CO	Jefferson	-105.20	39.86	✓			✓	2080	Denver, CO
8	380570124-1	ND	Mercer	-101.93	47.40				✓	-	(not in an MSA)
8	490110001-1	UT	Davis	-111.88	40.89	✓			✓	7160	Salt Lake City-Ogden, UT
8	490350003-1	UT	Salt Lake	-111.85	40.65	✓			✓	7160	Salt Lake City-Ogden, UT
8	490353006-1	UT	Salt Lake	-111.87	40.74				✓	7160	Salt Lake City-Ogden, UT
8	490490002-1	UT	Utah	-111.66	40.25	✓			✓	6520	Provo-Orem, UT
8	490570001-2	UT	Weber	-111.97	41.22	✓			✓	7160	Salt Lake City-Ogden, UT
9	040130019-1	AZ	Maricopa	-112.14	33.48	✓	✓	✓	✓	6200	Phoenix-Mesa, AZ
9	040133002-6	AZ	Maricopa	-112.04	33.46	✓	✓	✓	✓	6200	Phoenix-Mesa, AZ
9	040133003-1	AZ	Maricopa	-111.92	33.48	✓				6200	Phoenix-Mesa, AZ
9	040133010-1	AZ	Maricopa	-112.12	33.46			✓	✓	6200	Phoenix-Mesa, AZ
9	040191011-1	AZ	Pima	-110.87	32.21	✓	✓	✓	✓	8520	Tuscon, AZ

Table 1: Continued.

Region	Station ID	State	County	Lon	Lat	F	W	Sp	Su	MSA	MSA Description
9	060010003-1	CA	Alameda	-121.77	37.69	✓		✓	✓	5775	Oakland, CA
9	060011001-1	CA	Alameda	-121.96	37.54	✓		✓	✓	5775	Oakland, CA
9	060070002-1	CA	Butte	-121.84	39.76	✓		✓	✓	1620	Chico-Paradise, CA
9	060130002-1	CA	Contra Costa	-122.02	37.94	✓	✓	✓	✓	5775	Oakland, CA
9	060130003-1	CA	Contra Costa	-122.36	37.95	✓		✓		5775	Oakland, CA
9	060131002-1	CA	Contra Costa	-121.64	38.01	✓		✓	✓	5775	Oakland, CA
9	060131003-1	CA	Contra Costa	-122.34	37.96				✓	5775	Oakland, CA
9	060133001-1	CA	Contra Costa	-121.90	38.03	✓		✓	✓	5775	Oakland, CA
9	060170011-1	CA	El Dorado	-119.97	38.95	✓		✓	✓	6920	Sacramento, CA
9	060190007-1	CA	Fresno	-119.74	36.71	✓		✓	✓	2840	Fresno, CA
9	060190008-1	CA	Fresno	-119.77	36.78	✓		✓	✓	2840	Fresno, CA
9	060190242-1	CA	Fresno	-119.87	36.84	✓		✓	✓	2840	Fresno, CA
9	060194001-1	CA	Fresno	-119.50	36.60	✓		✓	✓	2840	Fresno, CA
9	060195001-1	CA	Fresno	-119.72	36.82	✓		✓	✓	2840	Fresno, CA
9	060250005-1	CA	Imperial	-115.48	32.68	✓	✓	✓	✓	-	(not in an MSA)
9	060250006-1	CA	Imperial	-115.39	32.68		✓	✓		-	(not in an MSA)
9	060290007-1	CA	Kern	-118.85	35.35	✓	✓	✓	✓	0680	Bakersfield, CA
9	060290010-1	CA	Kern	-119.01	35.39	✓	✓	✓	✓	0680	Bakersfield, CA
9	060290011-1	CA	Kern	-118.15	35.05				✓	0680	Bakersfield, CA
9	060290014-1	CA	Kern	-119.04	35.36	✓	✓	✓	✓	0680	Bakersfield, CA
9	060290232-1	CA	Kern	-119.02	35.44	✓	✓	✓	✓	0680	Bakersfield, CA
9	060295001-1	CA	Kern	-118.78	35.21	✓	✓	✓	✓	0680	Bakersfield, CA
9	060296001-1	CA	Kern	-119.27	35.50	✓	✓	✓	✓	0680	Bakersfield, CA
9	060311004-1	CA	Kings	-119.64	36.31	✓	✓	✓	✓	-	(not in an MSA)
9	060370002-2	CA	Los Angeles	-117.92	34.14	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060370016-1	CA	Los Angeles	-117.85	34.14	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060370113-1	CA	Los Angeles	-118.46	34.05	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060371002-2	CA	Los Angeles	-118.32	34.18	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060371103-1	CA	Los Angeles	-118.24	34.07	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060371201-2	CA	Los Angeles	-118.53	34.20	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060371301-2	CA	Los Angeles	-118.21	33.93	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060371601-2	CA	Los Angeles	-118.06	34.01	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA

Table 1: Continued.

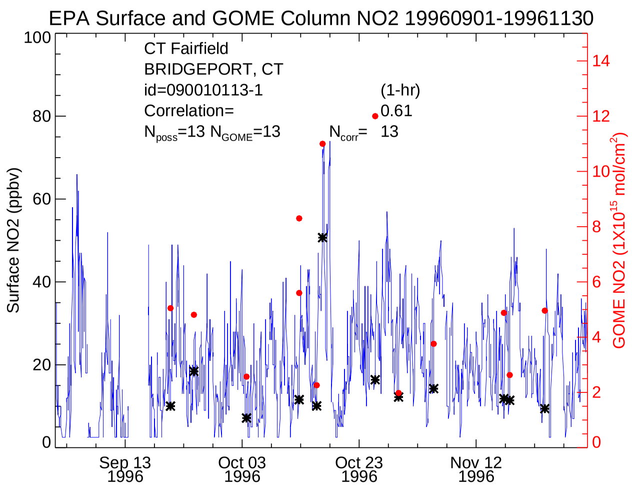
Region	Station ID	State	County	Lon	Lat	F	W	Sp	Su	MSA	MSA Description
9	060371701-2	CA	Los Angeles	-117.75	34.07	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060372005-1	CA	Los Angeles	-118.11	34.08	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060374002-2	CA	Los Angeles	-118.19	33.82		✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060375001-1	CA	Los Angeles	-118.37	33.93	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060379002-1	CA	Los Angeles	-118.13	34.69	✓	✓	✓	✓	4480	Los Angeles-Long Beach, CA
9	060410001-1	CA	Marin	-122.52	37.97	✓		✓	✓	7360	San Francisco, CA
9	060450008-1	CA	Mendocino	-123.20	39.15			✓	✓	-	(not in an MSA)
9	060450009-1	CA	Mendocino	-123.35	39.40			✓	✓	-	(not in an MSA)
9	060470003-1	CA	Merced	-120.43	37.28	✓		✓	✓	4940	Merced, CA
9	060531002-2	CA	Monterey	-121.63	36.70	✓	✓	✓	✓	7120	Salinas, CA
9	060550003-1	CA	Napa	-122.29	38.31	✓		✓	✓	8720	Vallejo-Fairfield-Napa, CA
9	060590001-5	CA	Orange	-117.91	33.82	✓	✓	✓	✓	5945	Orange County, CA
9	060591003-1	CA	Orange	-117.93	33.67	✓	✓	✓	✓	5945	Orange County, CA
9	060595001-2	CA	Orange	-117.95	33.93	✓	✓	✓	✓	5945	Orange County, CA
9	060610006-1	CA	Placer	-121.27	38.75	✓		✓	✓	6920	Sacramento, CA
9	060655001-2	CA	Riverside	-116.54	33.86	✓	✓	✓	✓	6780	Riverside-San Bernardino, CA
9	060658001-2	CA	Riverside	-117.43	34.01	✓	✓	✓	✓	6780	Riverside-San Bernardino, CA
9	060659001-1	CA	Riverside	-117.34	33.68	✓	✓	✓	✓	6780	Riverside-San Bernardino, CA
9	060670002-1	CA	Sacramento	-121.38	38.71	✓			✓	6920	Sacramento, CA
9	060670006-1	CA	Sacramento	-121.37	38.61	✓			✓	6920	Sacramento, CA
9	060670010-1	CA	Sacramento	-121.49	38.56	✓		✓	✓	6920	Sacramento, CA
9	060670011-1	CA	Sacramento	-121.42	38.30	✓			✓	6920	Sacramento, CA
9	060670012-1	CA	Sacramento	-121.16	38.68				✓	6920	Sacramento, CA
9	060675002-1	CA	Sacramento	-121.59	38.72	✓			✓	6920	Sacramento, CA
9	060710001-1	CA	San Bernardino	-117.02	34.90	✓	✓	✓		6780	Riverside-San Bernardino, CA
9	060710012-1	CA	San Bernardino	-117.56	34.43	✓			✓	6780	Riverside-San Bernardino, CA
9	060710014-1	CA	San Bernardino	-117.33	34.51	✓	✓	✓	✓	6780	Riverside-San Bernardino, CA
9	060710015-1	CA	San Bernardino	-117.37	35.78	✓				6780	Riverside-San Bernardino, CA
9	060710017-1	CA	San Bernardino	-116.06	34.14	✓	✓		✓	6780	Riverside-San Bernardino, CA
9	060711004-2	CA	San Bernardino	-117.67	34.10	✓	✓	✓	✓	6780	Riverside-San Bernardino, CA
9	060712002-1	CA	San Bernardino	-117.51	34.10	✓	✓	✓	✓	6780	Riverside-San Bernardino, CA
9	060714001-1	CA	San Bernardino	-117.28	34.42	✓	✓	✓	✓	6780	Riverside-San Bernardino, CA

Table 1: Continued.

Region	Station ID	State	County	Lon	Lat	F	W	Sp	Su	MSA	MSA Description
9	060719004-1	CA	San Bernardino	-117.27	34.11	✓	✓	✓	✓	6780	Riverside-San Bernardino, CA
9	060730001-1	CA	San Diego	-117.06	32.62	✓	✓	✓	✓	7320	San Diego, CA
9	060730003-1	CA	San Diego	-116.94	32.79	✓	✓	✓	✓	7320	San Diego, CA
9	060730005-1	CA	San Diego	-117.37	33.20	✓	✓	✓	✓	7320	San Diego, CA
9	060730006-1	CA	San Diego	-117.13	32.83	✓	✓	✓	✓	7320	San Diego, CA
9	060731002-1	CA	San Diego	-117.07	33.13	✓	✓	✓	✓	7320	San Diego, CA
9	060731006-1	CA	San Diego	-116.75	32.83	✓		✓		7320	San Diego, CA
9	060731007-1	CA	San Diego	-117.15	32.71	✓	✓	✓	✓	7320	San Diego, CA
9	060731008-1	CA	San Diego	-117.40	33.22			✓	✓	7320	San Diego, CA
9	060732007-1	CA	San Diego	-116.94	32.58	✓	✓	✓	✓	7320	San Diego, CA
9	060750005-1	CA	San Francisco	-122.39	37.76	✓	✓	✓	✓	7360	San Francisco, CA
9	060771002-2	CA	San Joaquin	-121.27	37.95	✓		✓	✓	8120	Stockton-Lodi, CA
9	060773003-1	CA	San Joaquin	-121.53	37.74	✓		✓	✓	8120	Stockton-Lodi, CA
9	060792002-1	CA	San Luis Obispo	-120.65	35.28	✓	✓	✓	✓	7460	San Luis Obispo-Atascadero-Paso Robles, CA
9	060798001-1	CA	San Luis Obispo	-120.67	35.49	✓	✓	✓	✓	7460	San Luis Obispo-Atascadero-Paso Robles, CA
9	060811001-1	CA	San Mateo	-122.20	37.48	✓	✓	✓	✓	7360	San Francisco, CA
9	060830008-1	CA	Santa Barbara	-120.02	34.46	✓	✓			7480	Santa Barbara-Santa Maria-Lompoc, CA
9	060830010-1	CA	Santa Barbara	-119.70	34.42	✓	✓	✓	✓	7480	Santa Barbara-Santa Maria-Lompoc, CA
9	060831007-1	CA	Santa Barbara	-120.43	34.95	✓	✓	✓	✓	7480	Santa Barbara-Santa Maria-Lompoc, CA
9	060831015-1	CA	Santa Barbara	-120.21	34.48	✓				7480	Santa Barbara-Santa Maria-Lompoc, CA
9	060831018-1	CA	Santa Barbara	-120.20	34.53			✓	✓	7480	Santa Barbara-Santa Maria-Lompoc, CA
9	060831021-1	CA	Santa Barbara	-119.46	34.40	✓	✓	✓	✓	7480	Santa Barbara-Santa Maria-Lompoc, CA
9	060831026-1	CA	Santa Barbara	-120.03	34.48	✓				7480	Santa Barbara-Santa Maria-Lompoc, CA
9	060831027-1	CA	Santa Barbara	-120.04	34.47	✓				7480	Santa Barbara-Santa Maria-Lompoc, CA
9	060832004-1	CA	Santa Barbara	-120.46	34.64	✓	✓	✓		7480	Santa Barbara-Santa Maria-Lompoc, CA
9	060832011-1	CA	Santa Barbara	-119.83	34.45	✓	✓	✓	✓	7480	Santa Barbara-Santa Maria-Lompoc, CA
9	060850004-1	CA	Santa Clara	-121.89	37.34	✓	✓	✓	✓	7400	San Jose, CA
9	060950004-1	CA	Solano	-122.24	38.10	✓		✓	✓	8720	Vallejo-Fairfield-Napa, CA
9	060970003-1	CA	Sonoma	-122.71	38.45	✓	✓	✓	✓	7500	Santa Rosa, CA
9	060990005-1	CA	Stanislaus	-120.99	37.64	✓		✓	✓	5170	Modesto, CA
9	060990006-1	CA	Stanislaus	-120.84	37.49	✓		✓	✓	5170	Modesto, CA
9	061010003-1	CA	Sutter	-121.62	39.14	✓		✓	✓	9340	Yuba City, CA

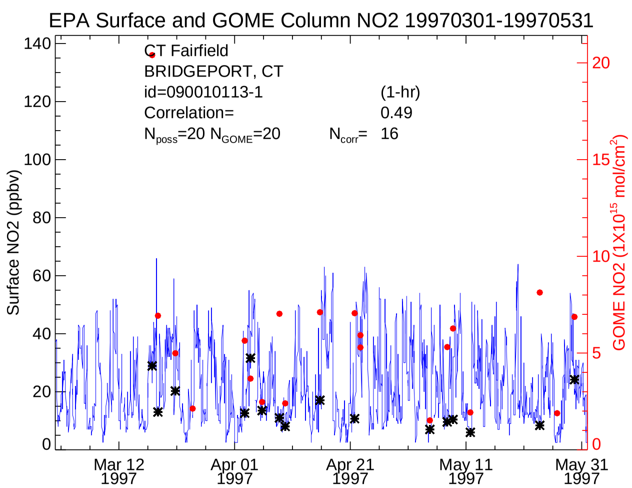
Table 1: Continued.

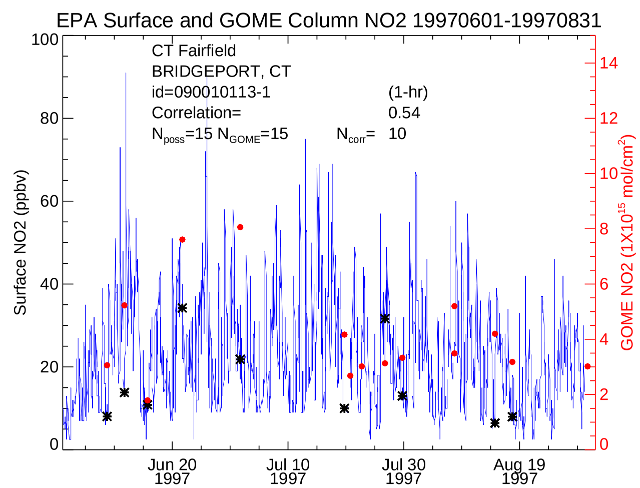
Region	Station ID	State	County	Lon	Lat	F	W	Sp	Su	MSA	MSA Description
9	061072002-1	CA	Tulare	-119.29	36.33	✓	✓	✓	✓	8780	Visalia-Tulare-Porterville, CA
9	061110005-1	CA	Ventura	-119.42	34.39	✓		✓	✓	8735	Ventura, CA
9	061110007-1	CA	Ventura	-118.87	34.21	✓	✓	✓	✓	8735	Ventura, CA
9	061111004-1	CA	Ventura	-119.23	34.45	✓		✓	✓	8735	Ventura, CA
9	061112002-1	CA	Ventura	-118.68	34.28	✓	✓	✓	✓	8735	Ventura, CA
9	061112003-1	CA	Ventura	-119.31	34.29	✓	✓	✓		8735	Ventura, CA
9	061113001-1	CA	Ventura	-119.14	34.25	✓		✓	✓	8735	Ventura, CA
9	061130004-1	CA	Yolo	-121.78	38.53	✓			✓	9270	Yolo, CA
9	320030557-1	NV	Clark	-115.11	36.16	✓	✓			4120	Las Vegas, NV-AZ
9	320050004-1	NV	Douglas	-119.94	38.96				✓	-	(not in an MSA)
9	325100004-1	NV	Carson City	-119.76	39.17			✓	✓	-	(not in an MSA)
10	160010016-1	ID	Ada	-116.21	43.62	✓		✓	✓	1080	Boise City, ID
10	160050015-1	ID	Bannock	-112.46	42.88	✓				6340	Pocatello, ID
10	410510080-1	OR	Multnomah	-122.60	45.50				✓	6440	Portland-Vancouver, OR-WA
10	530110011-1	WA	Clark	-122.52	45.62				✓	6440	Portland-Vancouver, OR-WA
10	530330080-1	WA	King	-122.31	47.57				✓	7600	Seattle-Bellevue-Everett, WA



Insufficient Coincident Data

Winter (12/1/96-2/28/97)





Insufficient Coincident Data

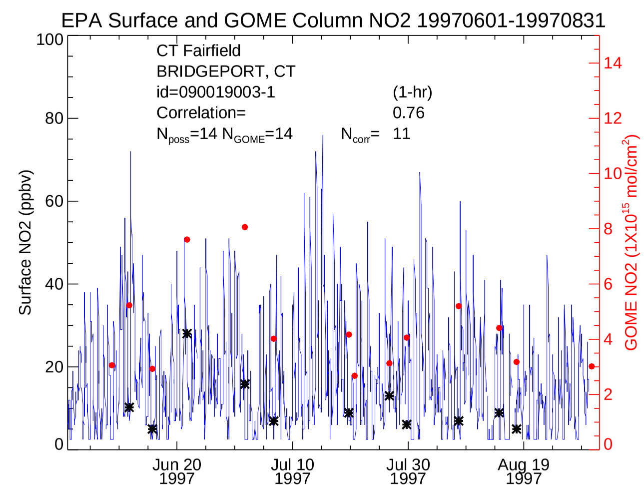
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



Insufficient Coincident Data

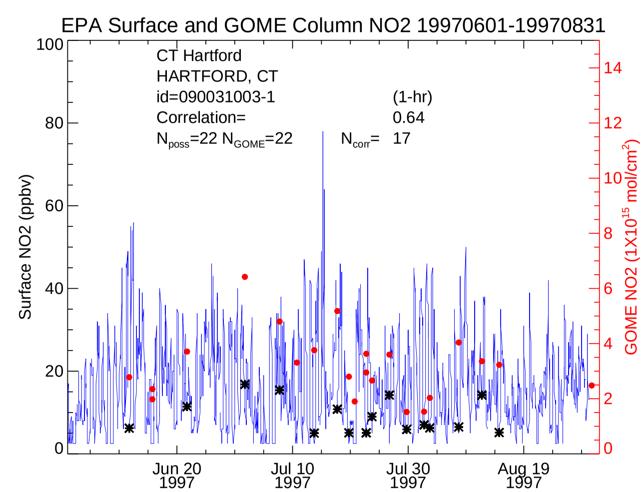
Fall (9/1/96-11/30/96)

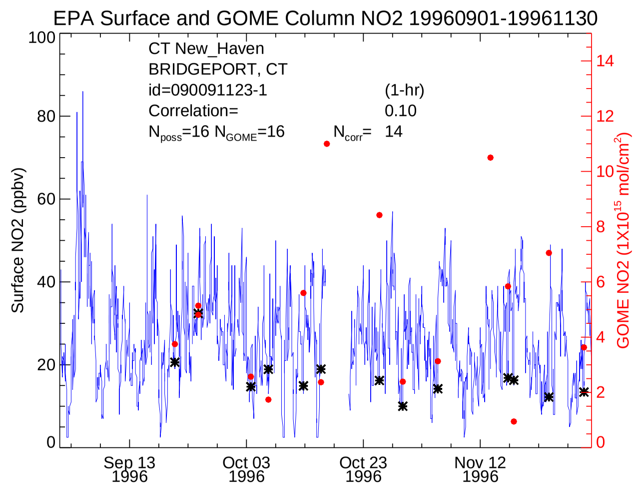
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

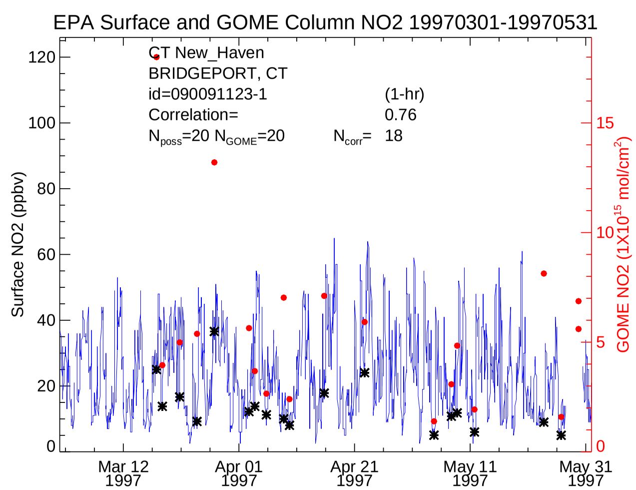
Spring (3/1/97-5/31/97)

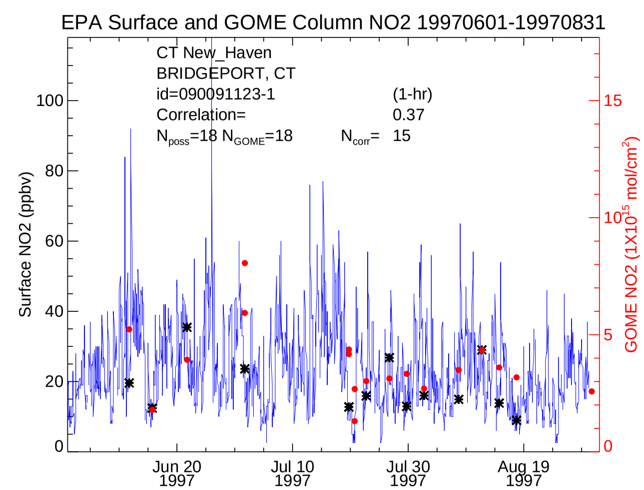


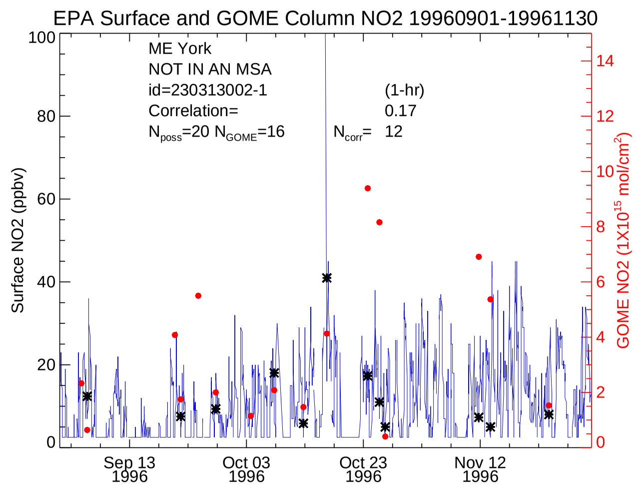


Insufficient Coincident Data

Winter (12/1/96-2/28/97)





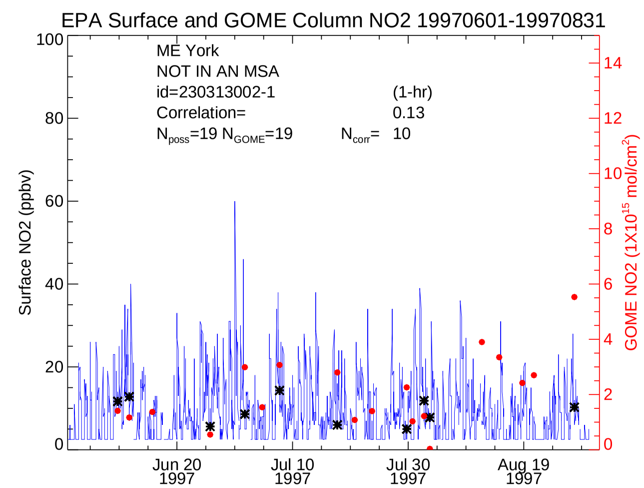


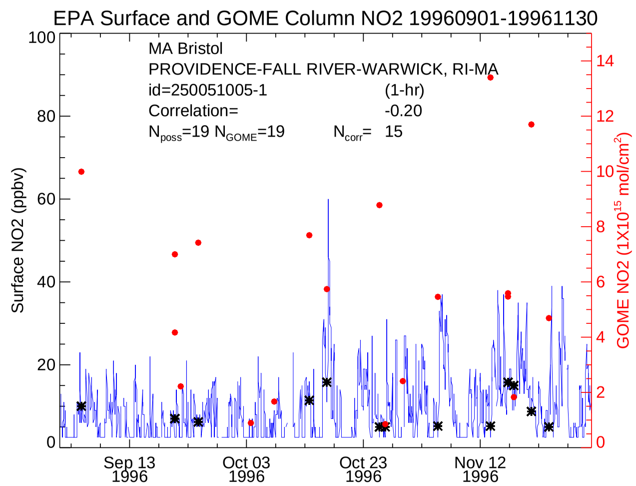
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)





Insufficient Coincident Data

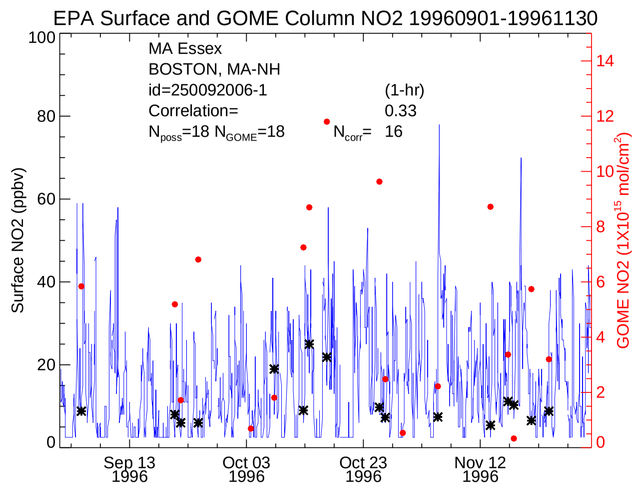
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

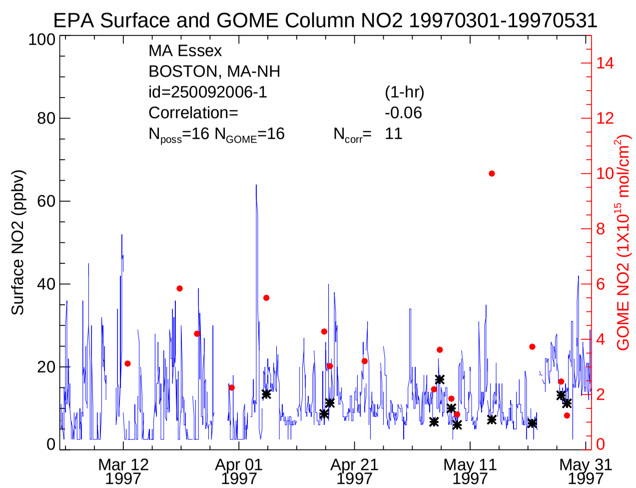
Insufficient Coincident Data

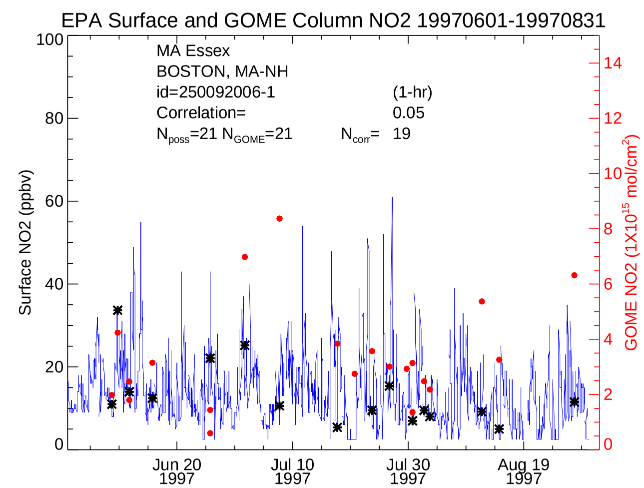
Summer (6/1/97-8/31/97)

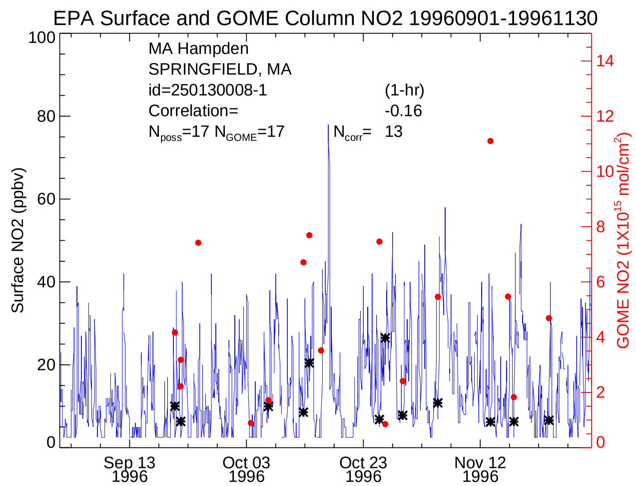


Insufficient Coincident Data

Winter (12/1/96-2/28/97)







Insufficient Coincident Data

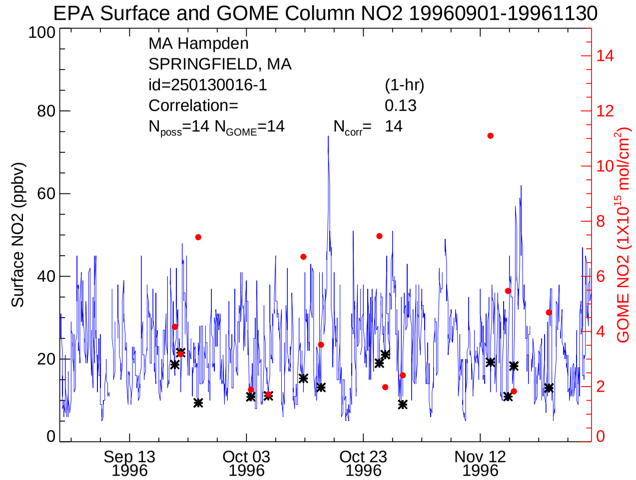
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

Insufficient Coincident Data

Summer (6/1/97-8/31/97)



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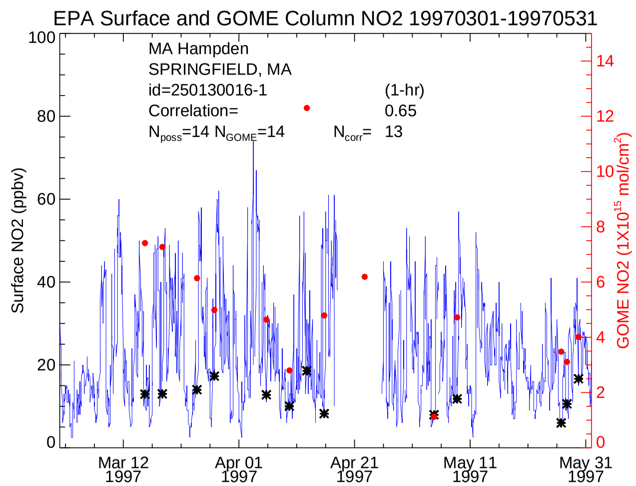
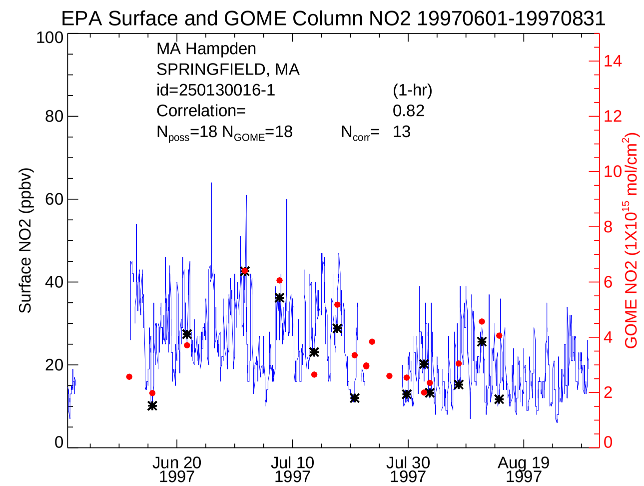
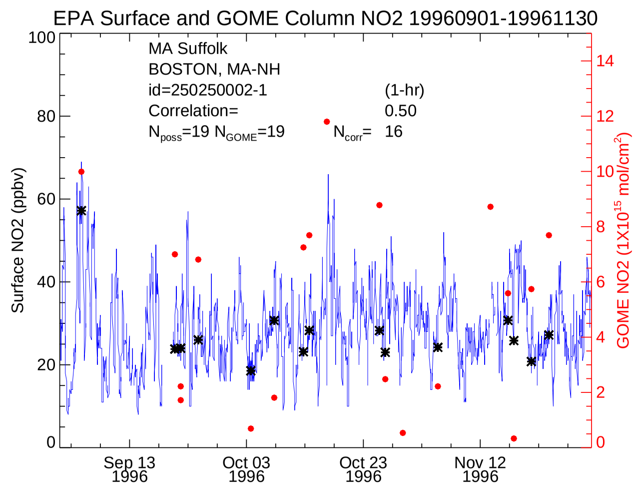
Winter (12/1/96-2/28/97)

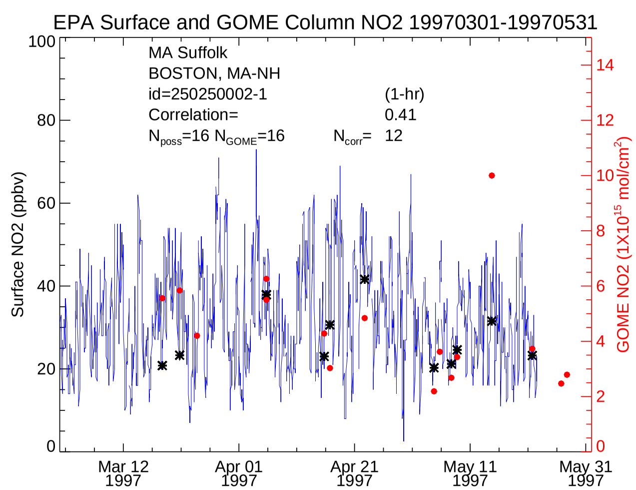


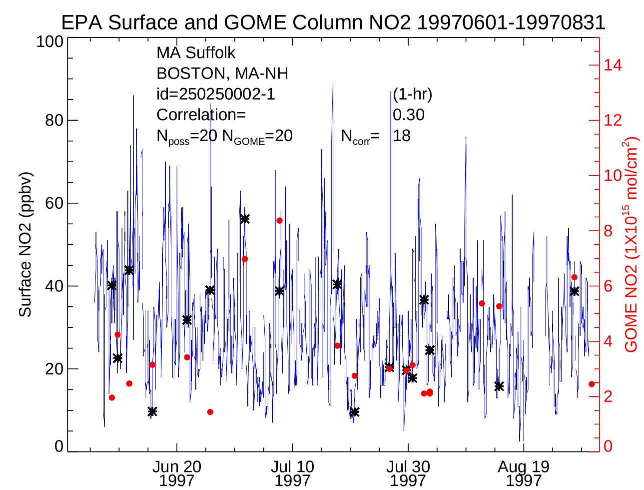


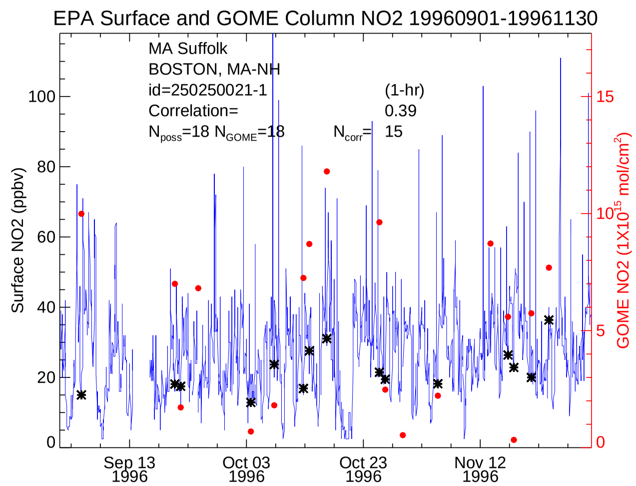


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

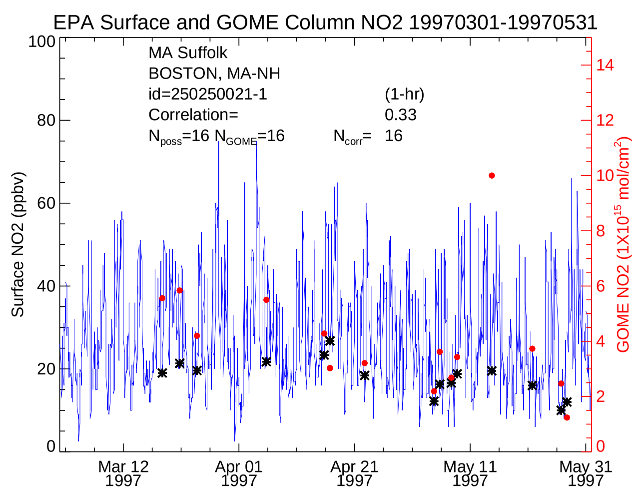


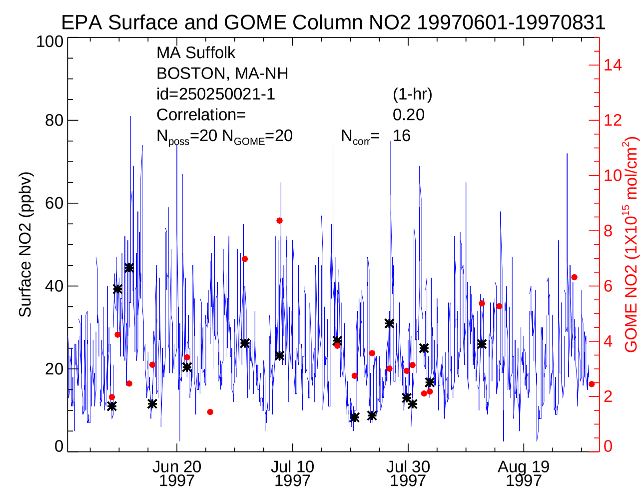


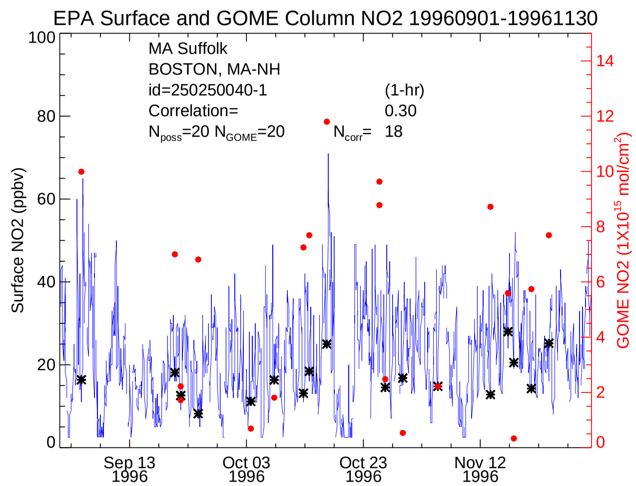


Insufficient Coincident Data

Winter (12/1/96-2/28/97)







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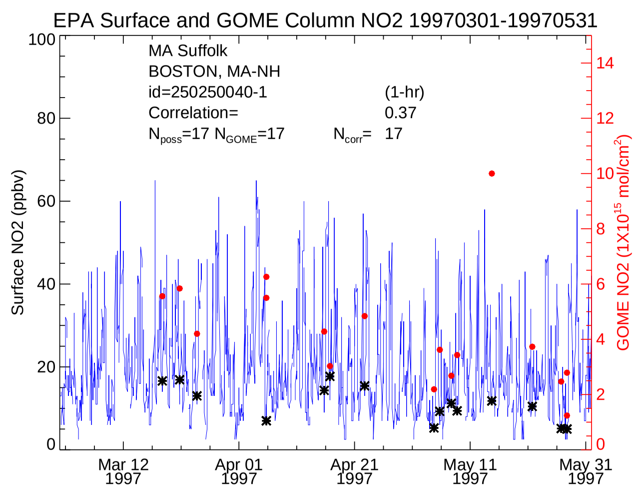
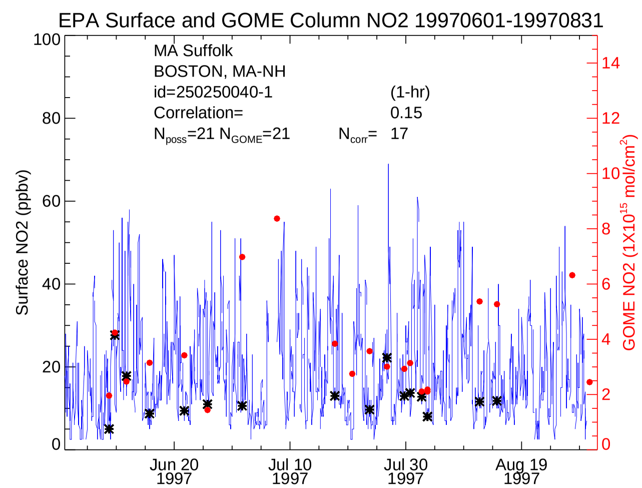
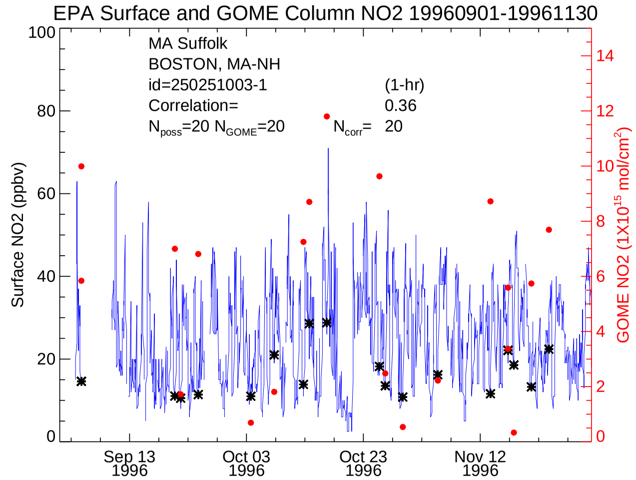
Winter (12/1/96-2/28/97)

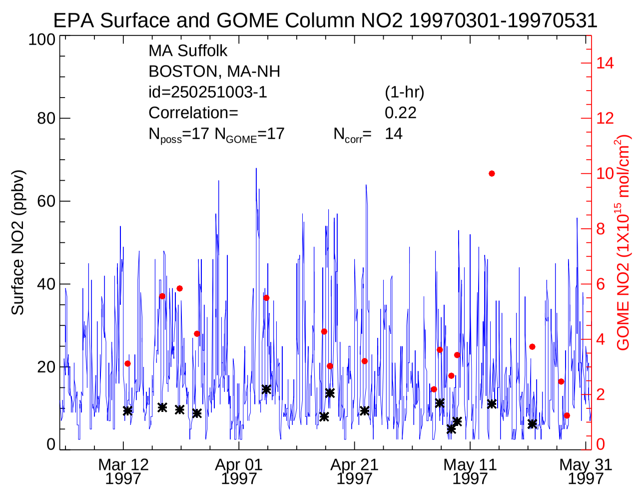


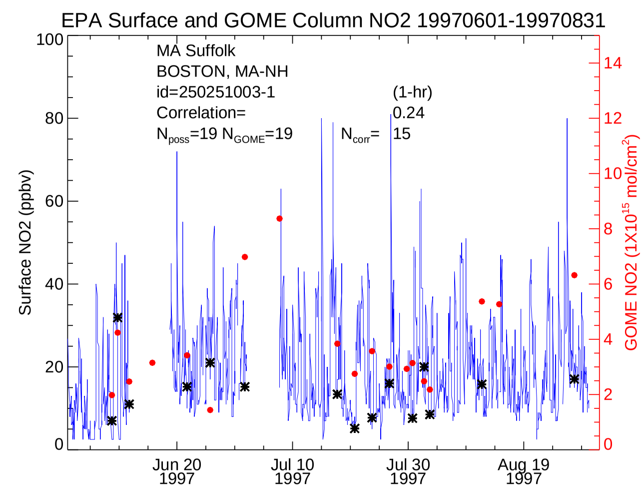


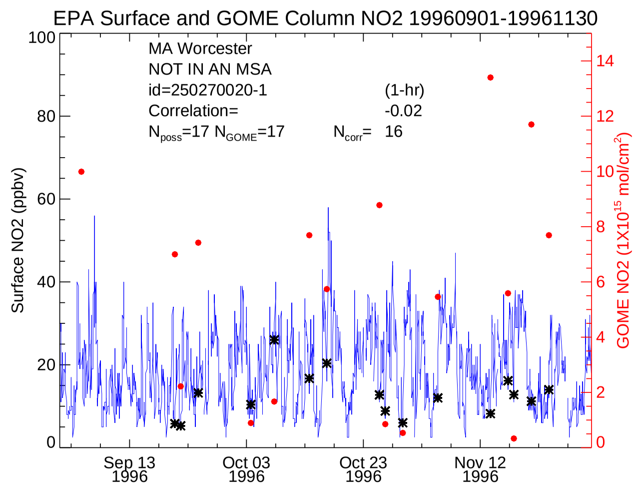


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

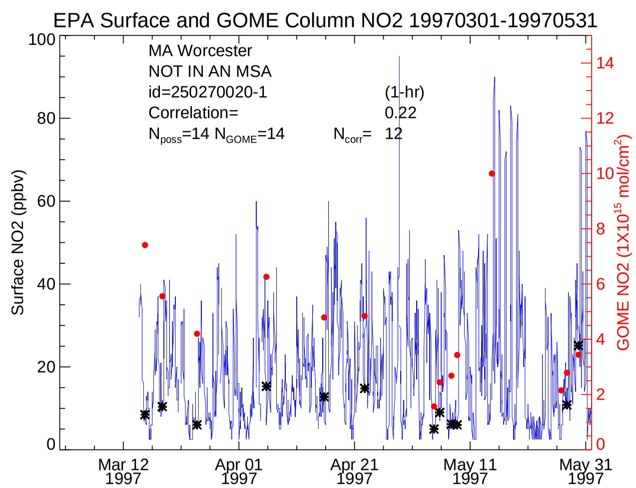


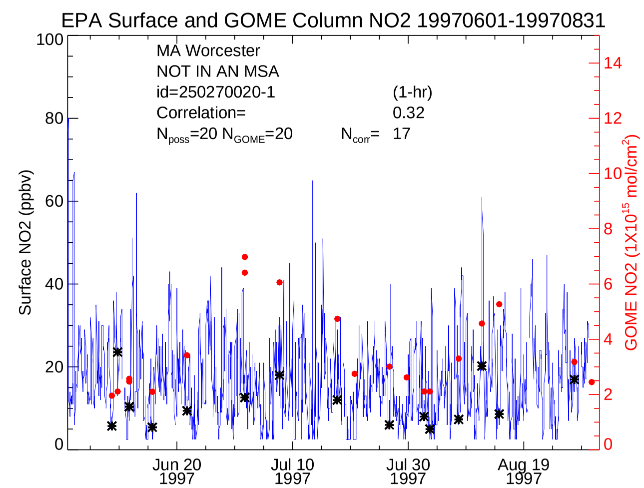


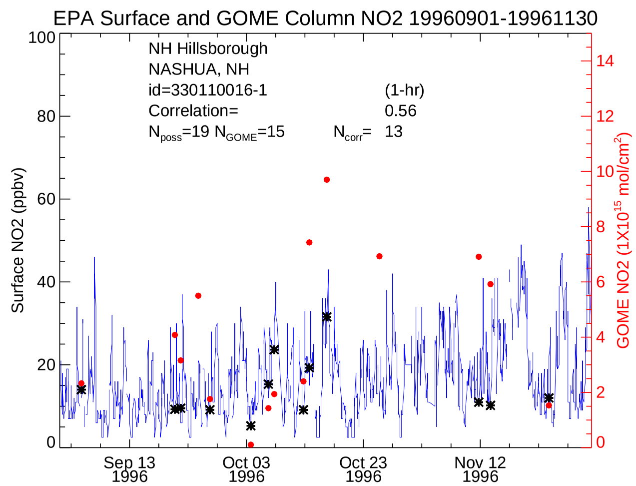


Insufficient Coincident Data

Winter (12/1/96-2/28/97)







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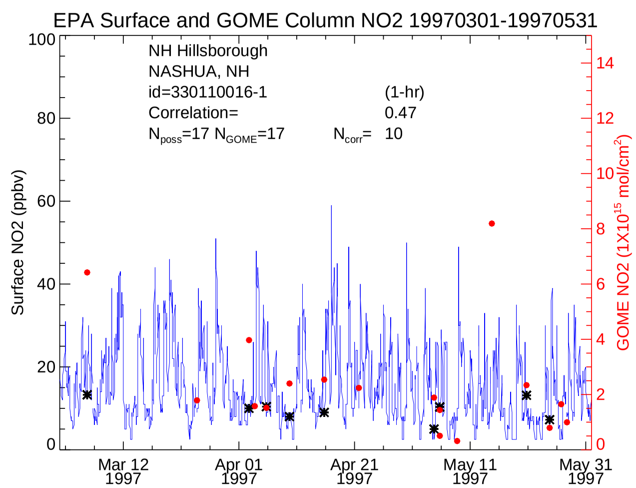
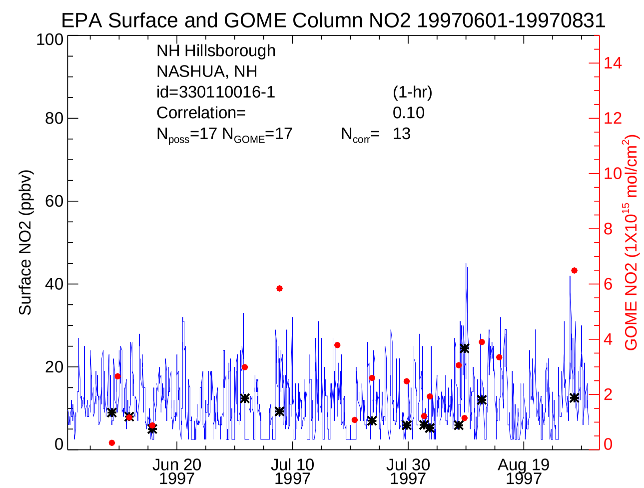
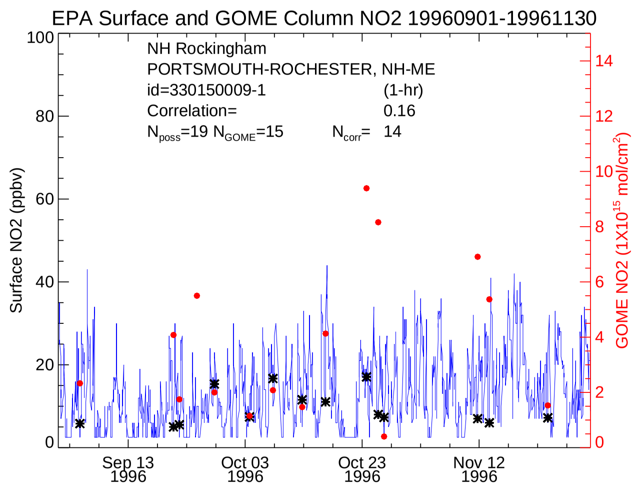
Winter (12/1/96-2/28/97)





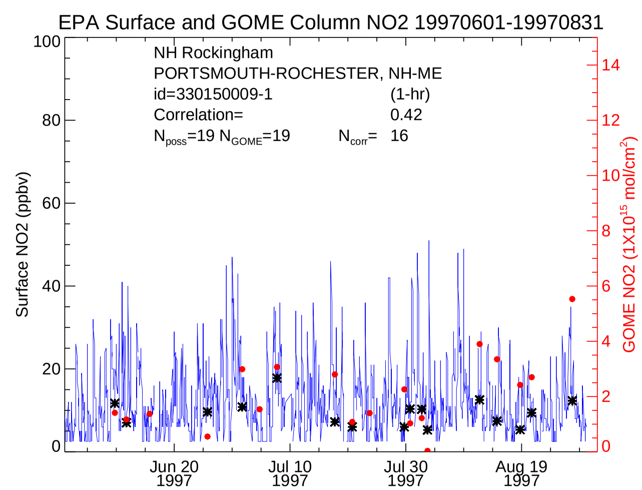


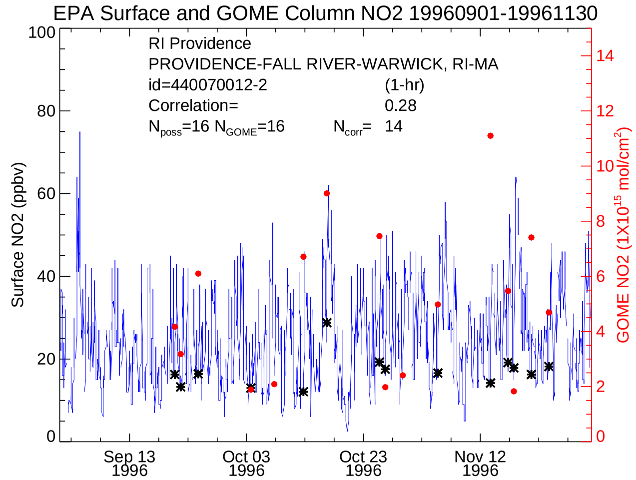
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

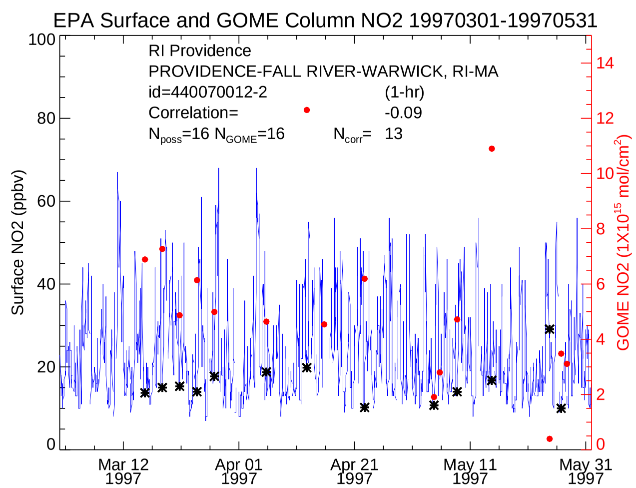
Spring (3/1/97-5/31/97)

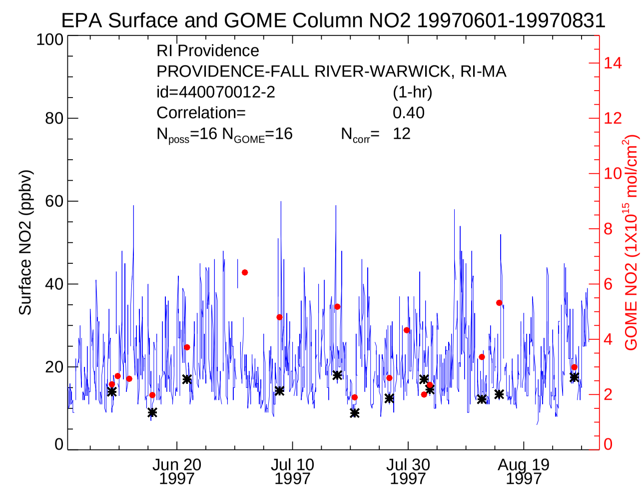




Insufficient Coincident Data

Winter (12/1/96-2/28/97)





Insufficient Coincident Data

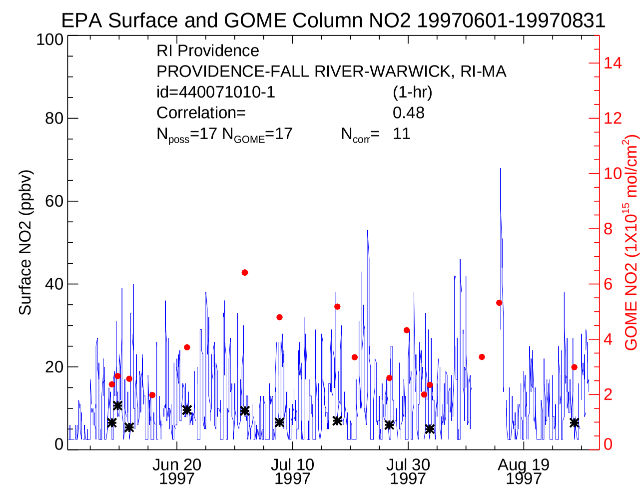
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



Insufficient Coincident Data

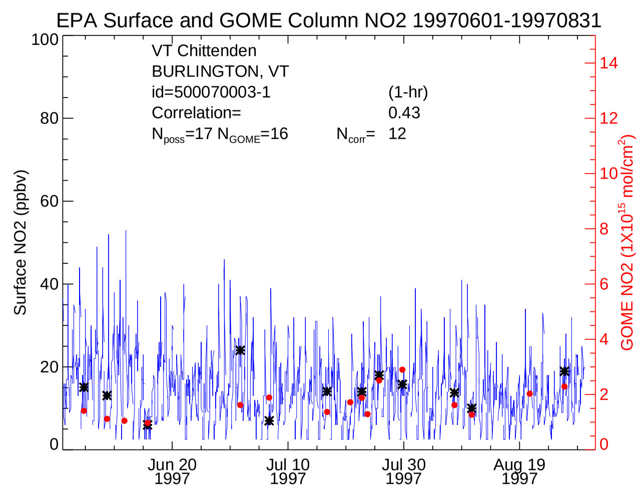
Fall (9/1/96-11/30/96)

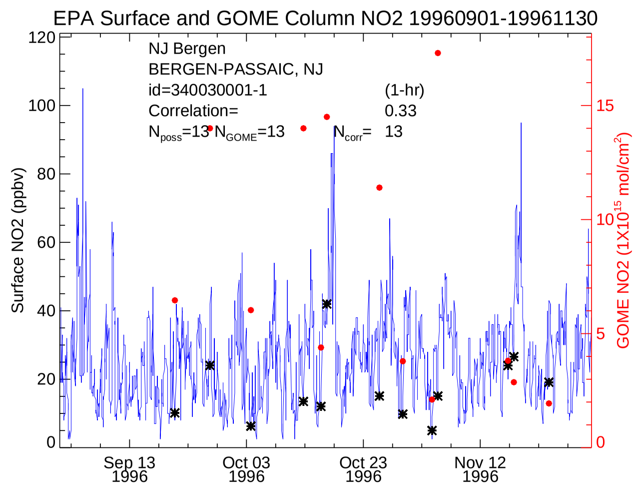
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

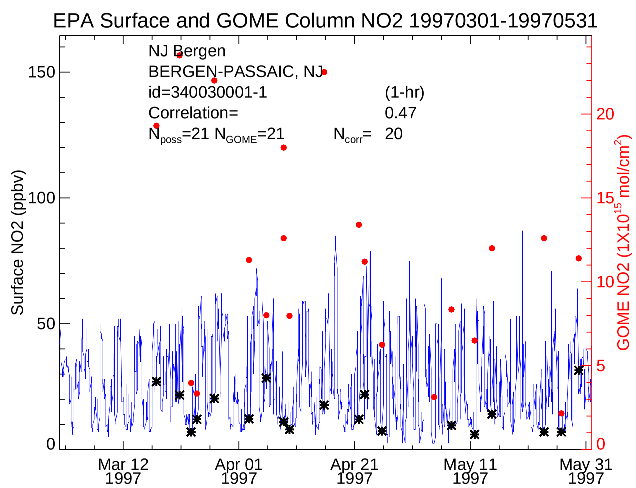
Spring (3/1/97-5/31/97)

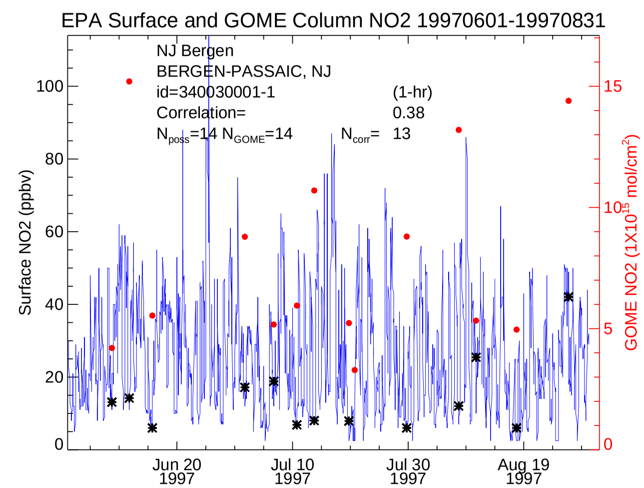


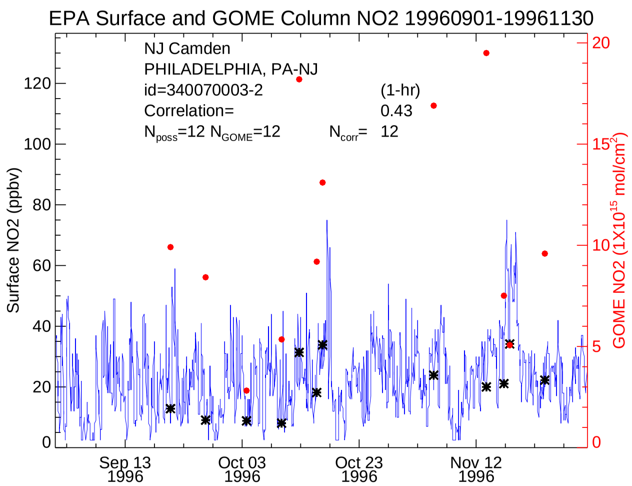


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

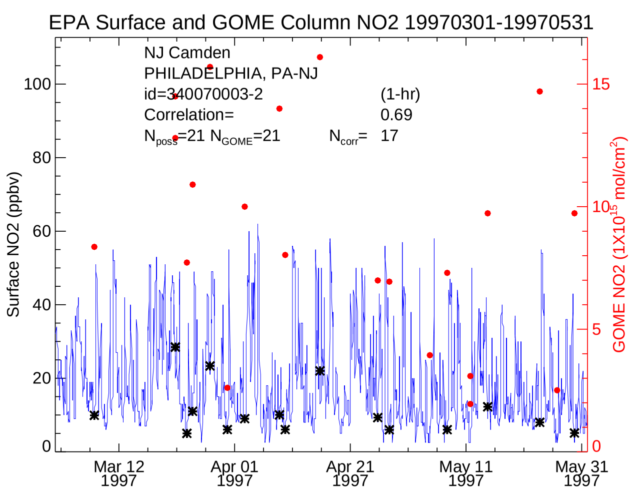


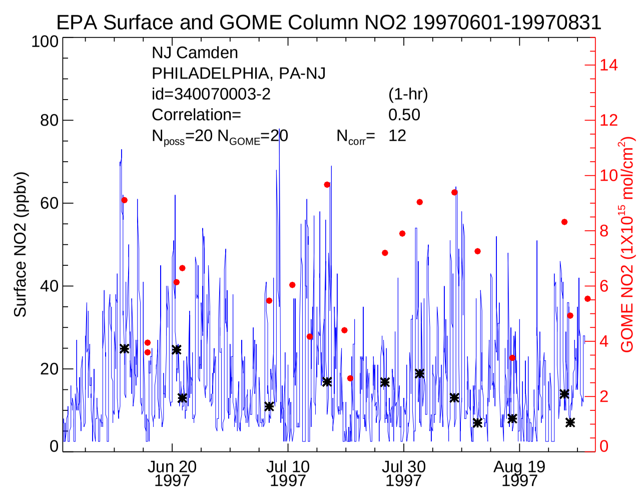


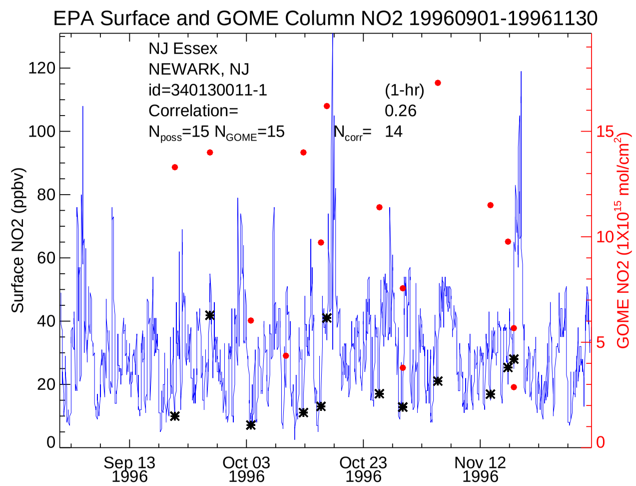


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

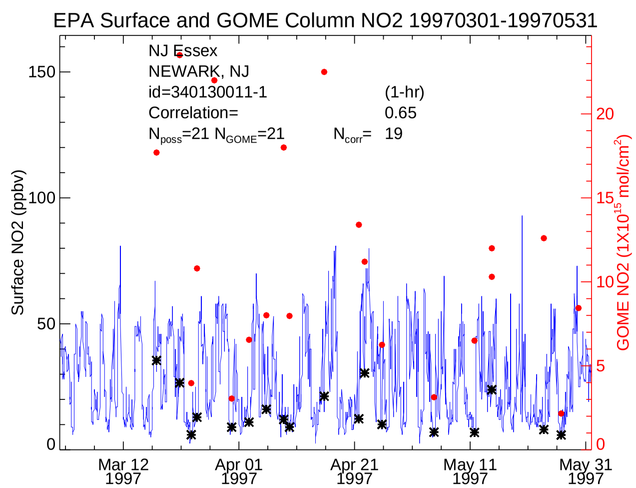


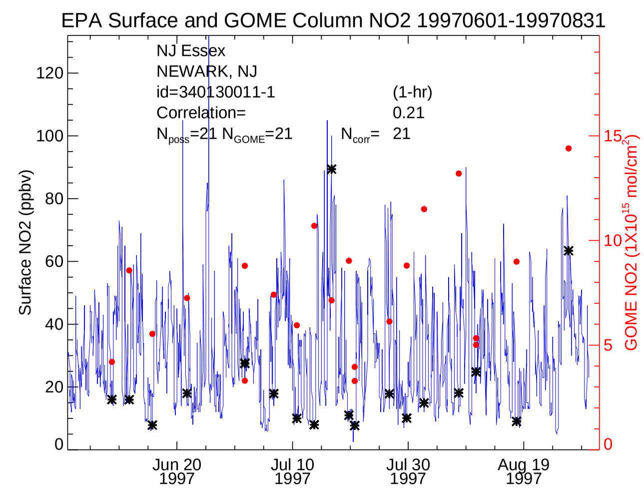


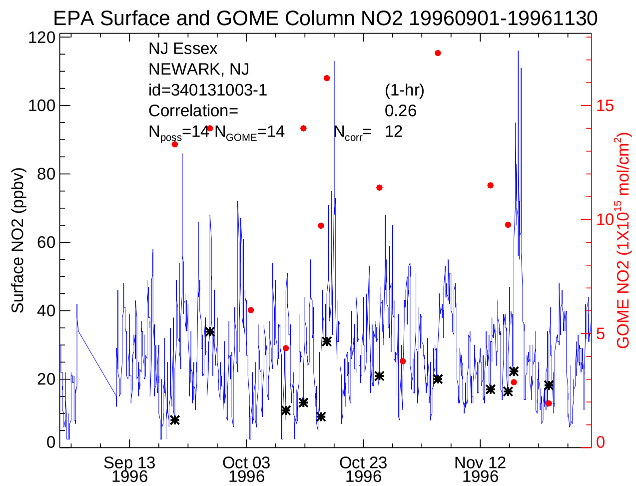


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

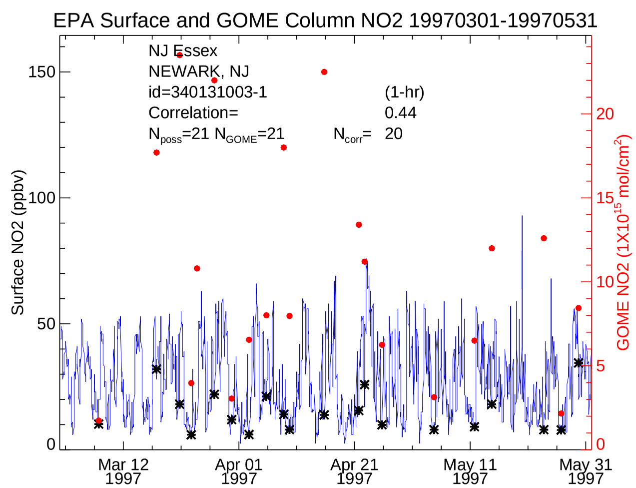


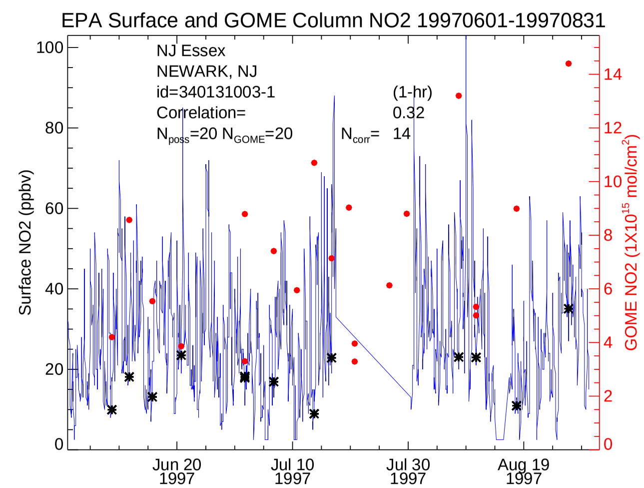


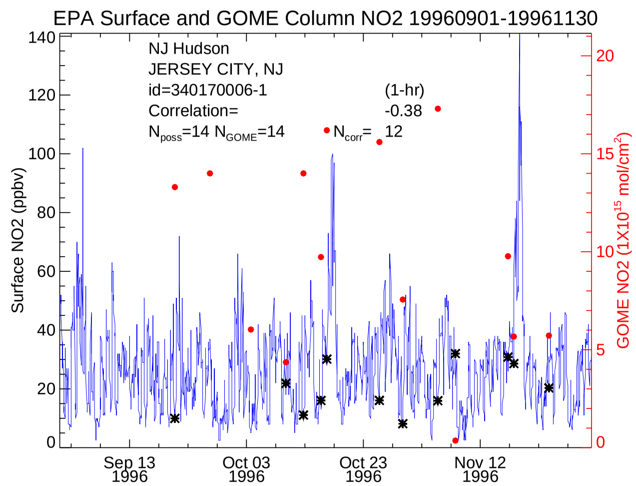


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

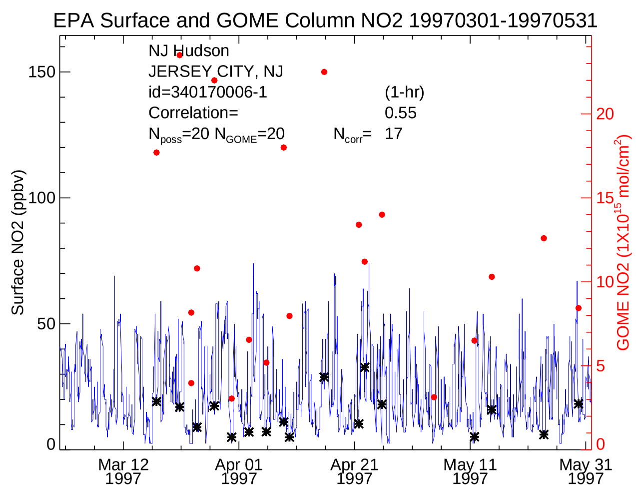


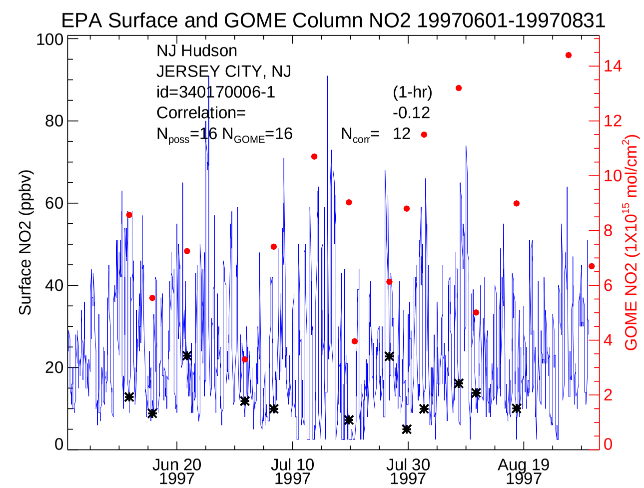


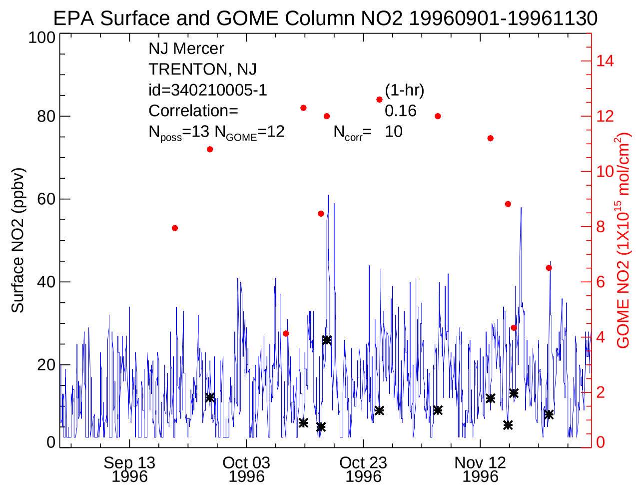


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

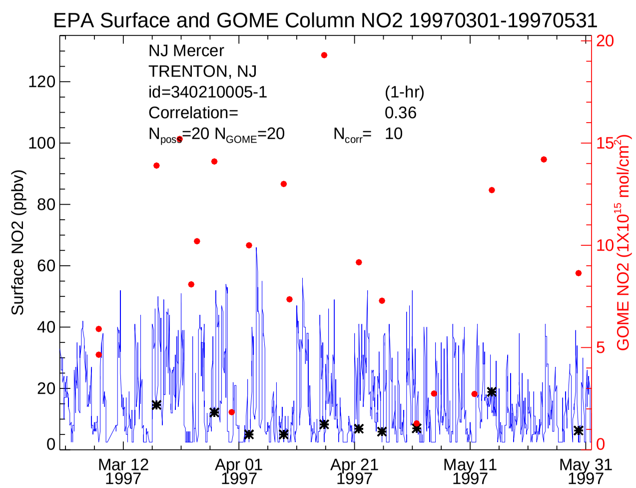






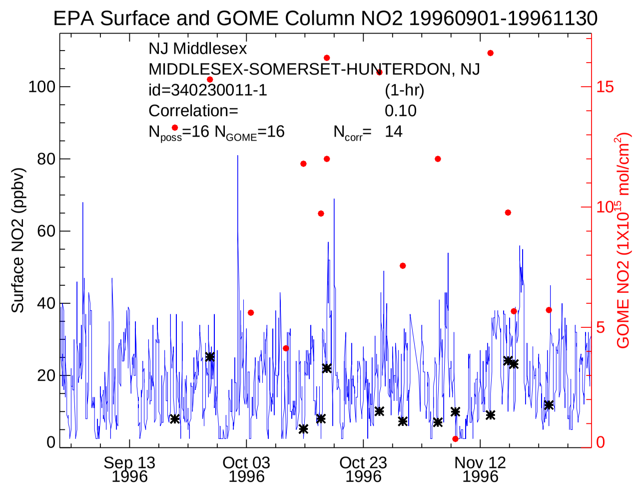
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



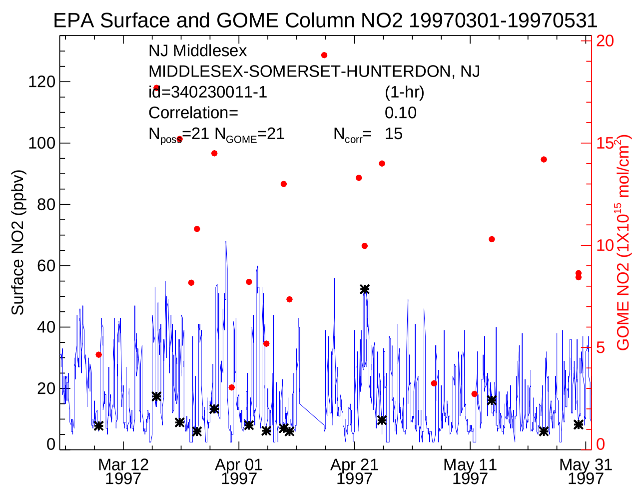
Insufficient Coincident Data

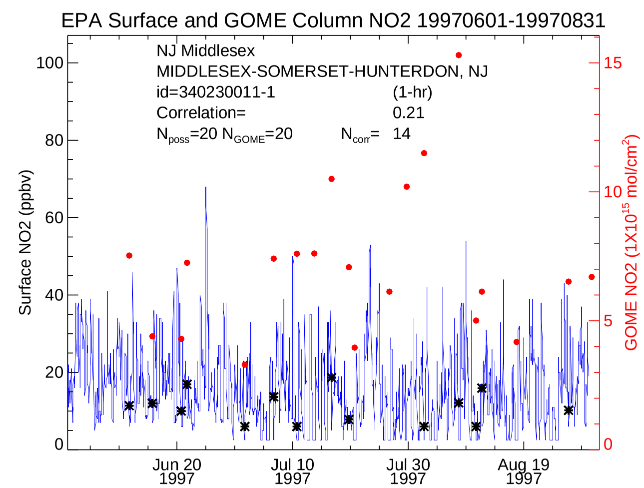
Summer (6/1/97-8/31/97)

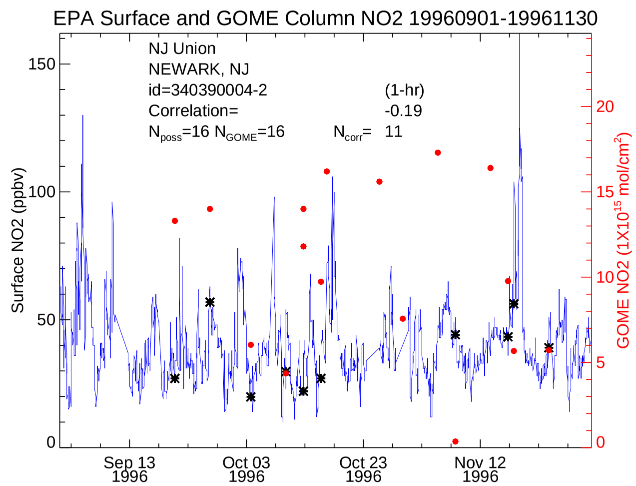


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

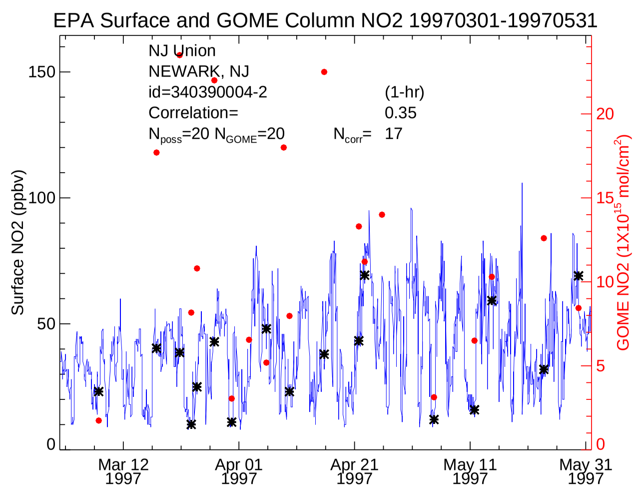


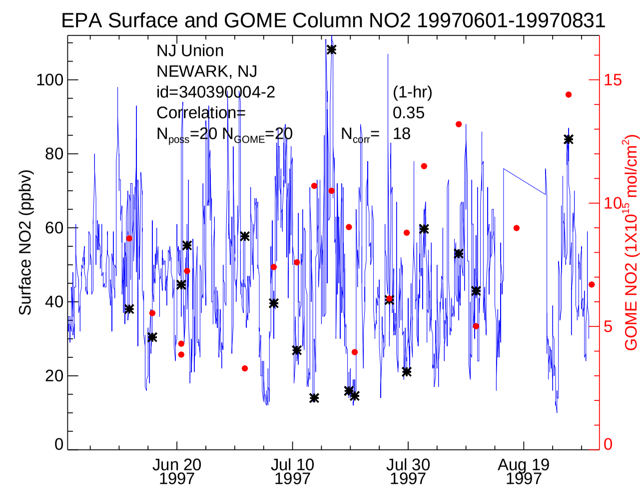


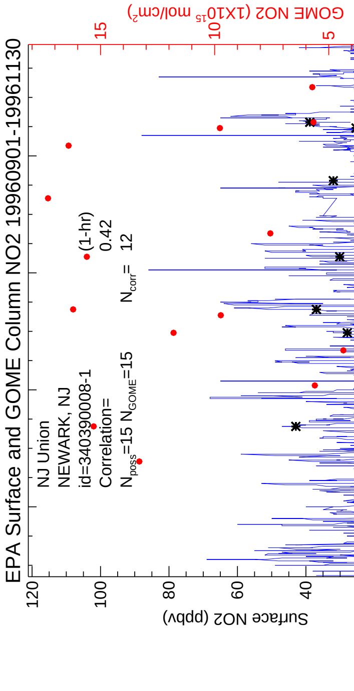


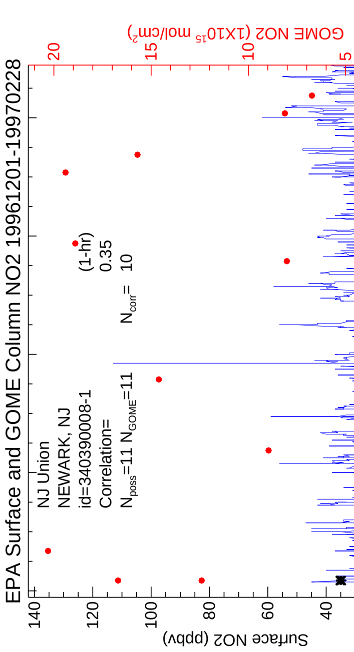
Insufficient Coincident Data

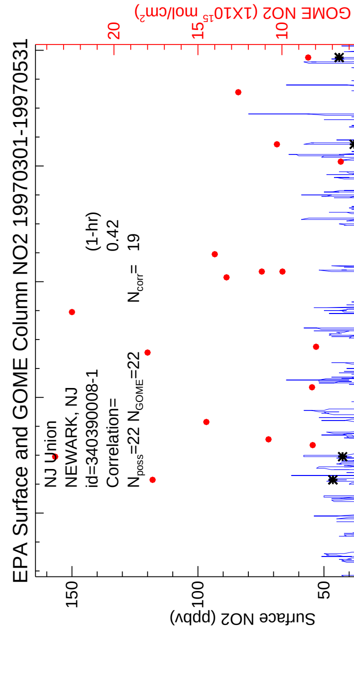
Winter (12/1/96-2/28/97)

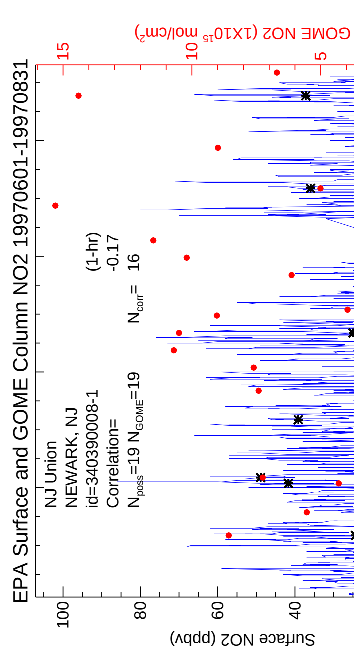





EPA Surface and GOME Column NO2 19960901-19961130
NJ Union
NEWARK, NJ
id=340390008-1
Correlation= (1-hr) 0.42
Nposs=15 NGOME=15
Ncorr= 12
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996


EPA Surface and GOME Column NO2 19961201-19970228
NJ Union
NEWARK, NJ
id=340390008-1
Correlation= (1-hr) 0.35
Nposs=11 NGOME=11
Ncorr= 10
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997


EPA Surface and GOME Column NO2 19970301-19970531
NJ Union
NEWARK, NJ
id=340390008-1
Correlation= (1-hr) 0.42
Nposs=22 NGOME=22
Ncorr= 19
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997


EPA Surface and GOME Column NO2 19970601-19970831
NJ Union
NEWARK, NJ
id=340390008-1
Correlation= (1-hr) -0.17
Nposs=19 NGOME=19
Ncorr= 16
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

Insufficient Coincident Data

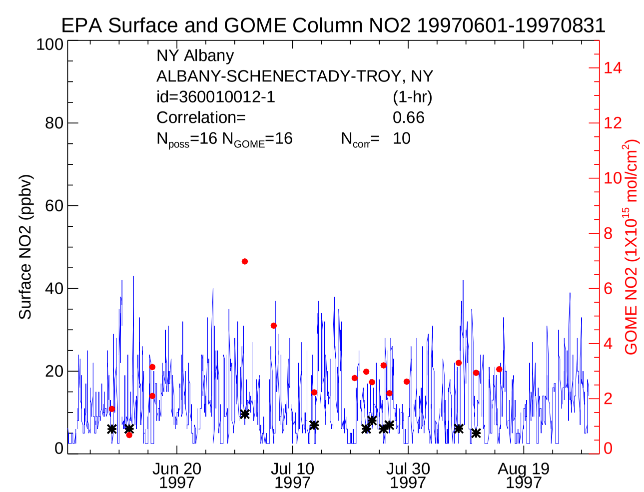
Fall (9/1/96-11/30/96)

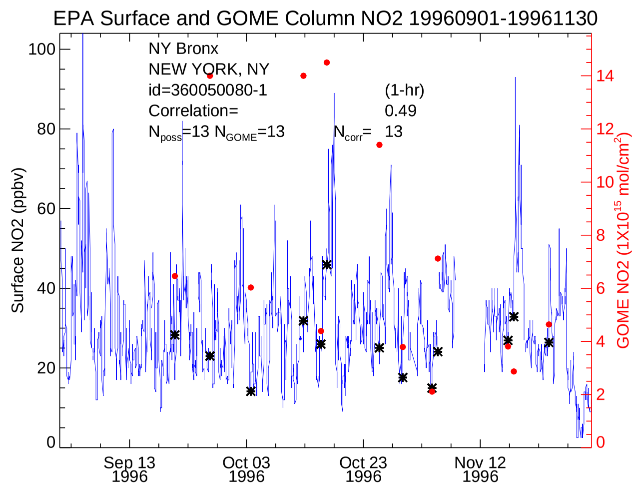
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

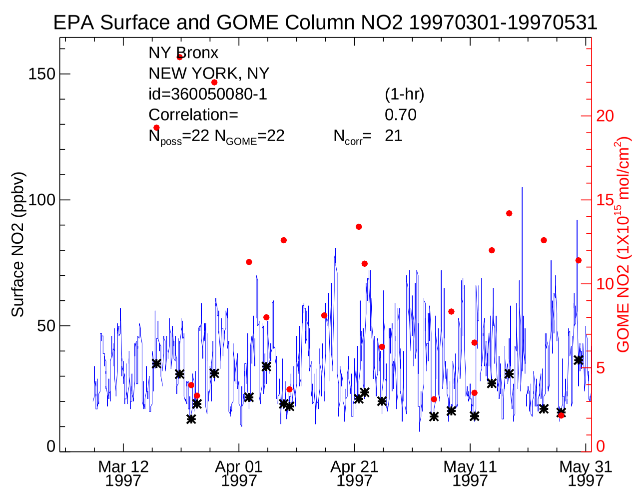
Spring (3/1/97-5/31/97)

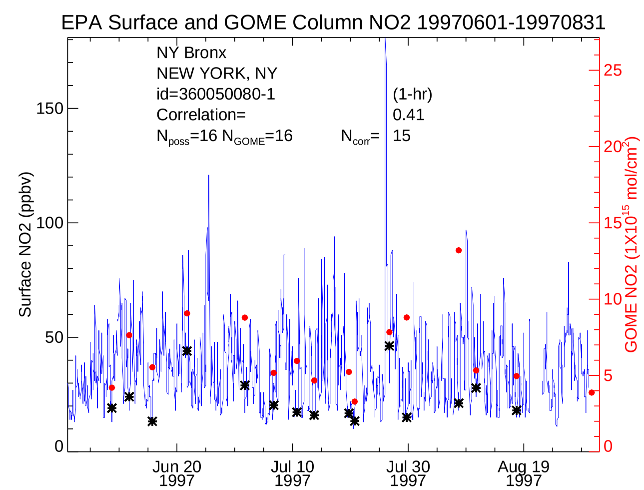




Insufficient Coincident Data

Winter (12/1/96-2/28/97)



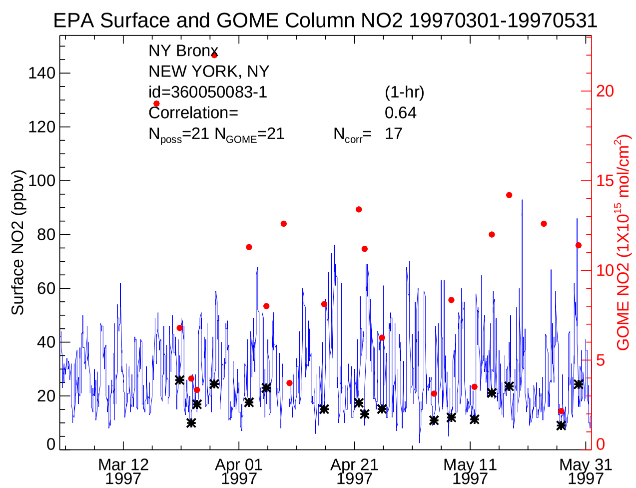


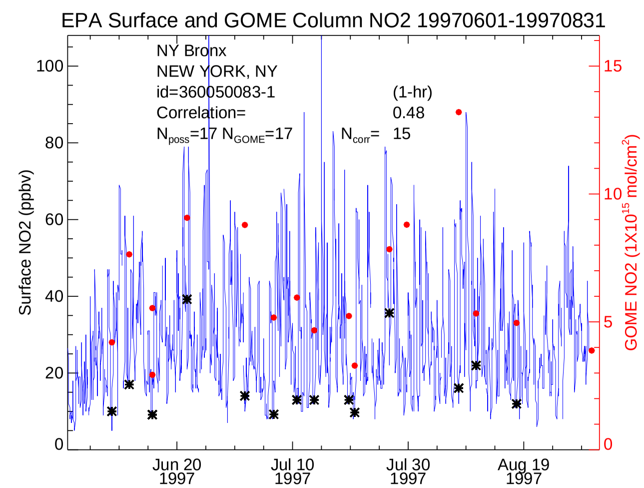
Insufficient Coincident Data

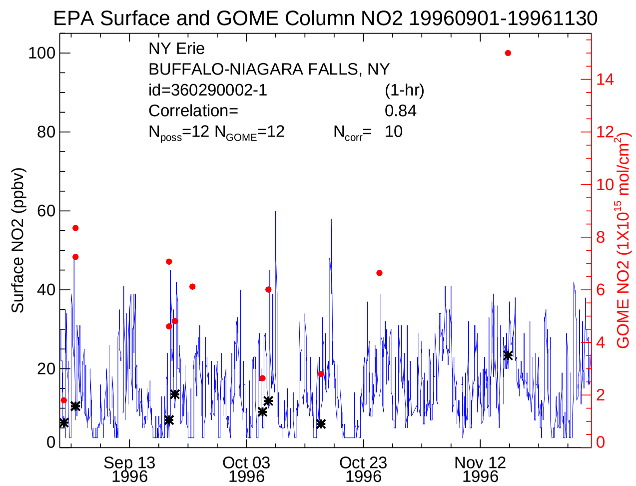
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)





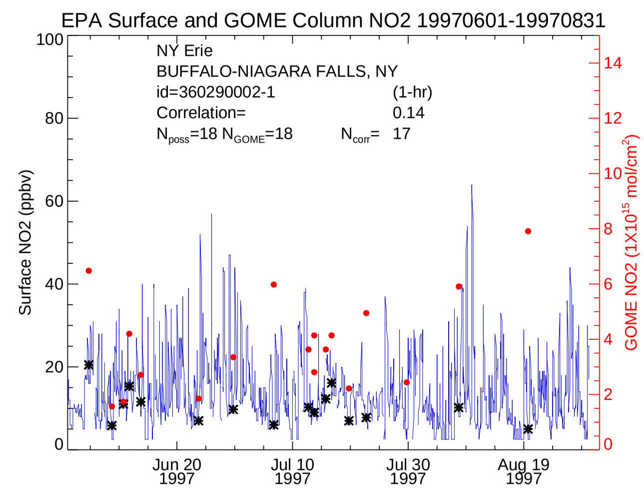


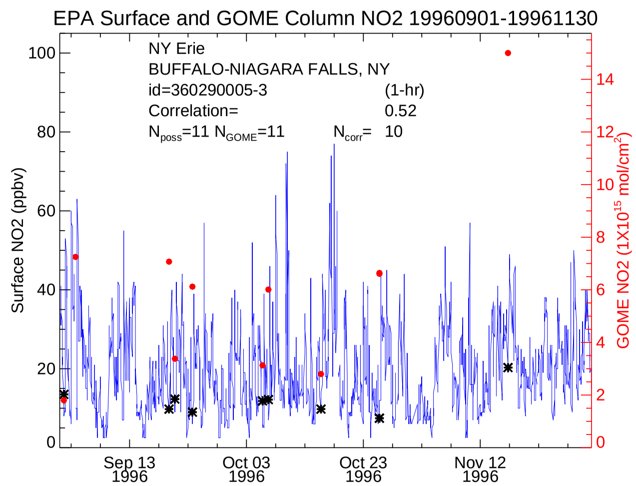
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



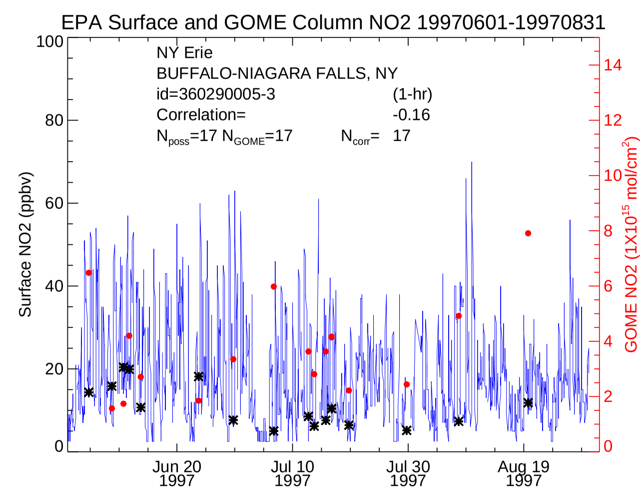


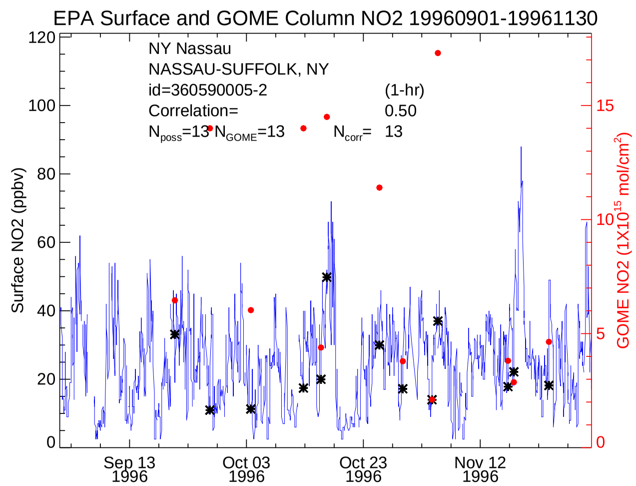
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

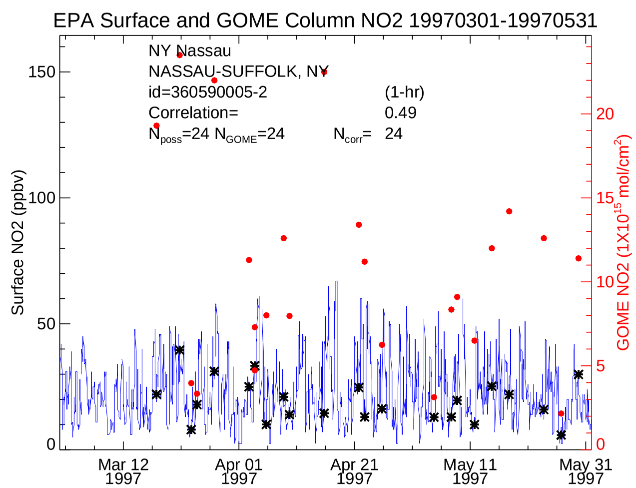
Spring (3/1/97-5/31/97)

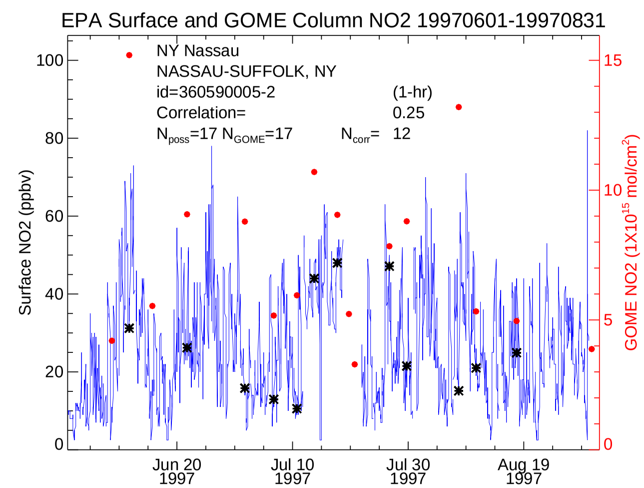


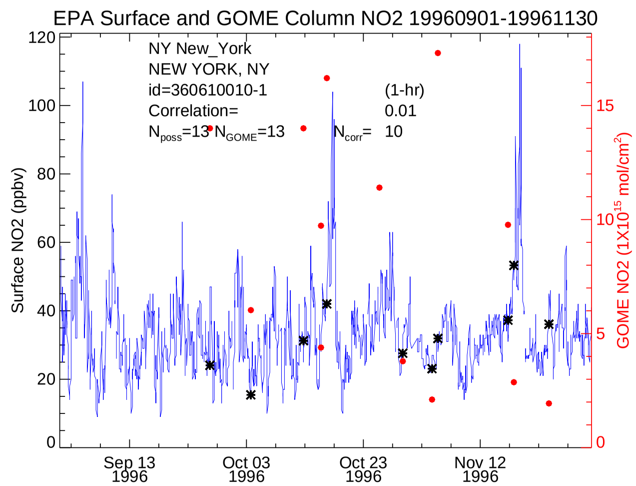


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

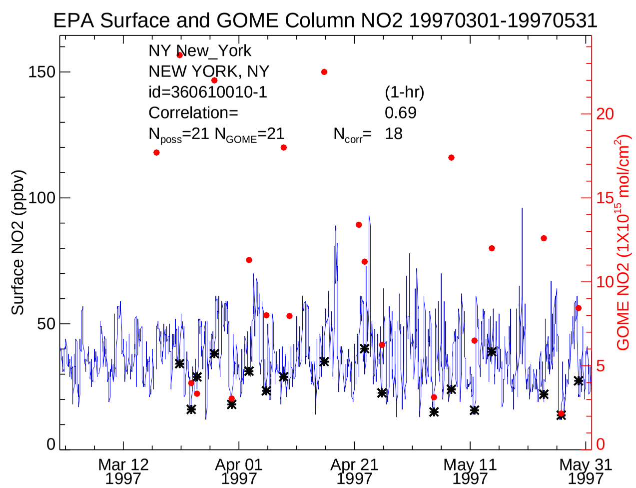






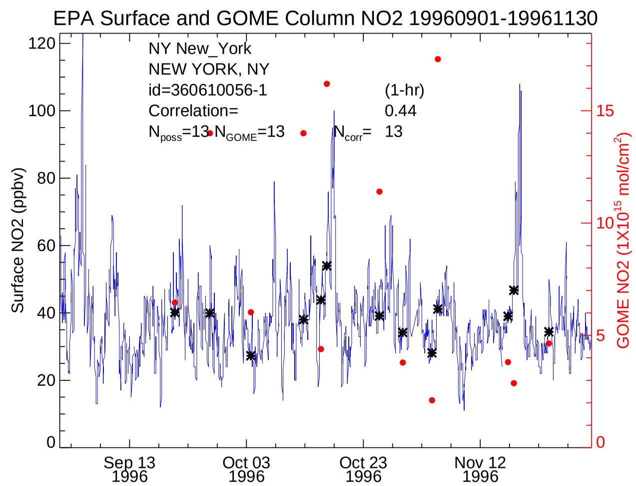
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



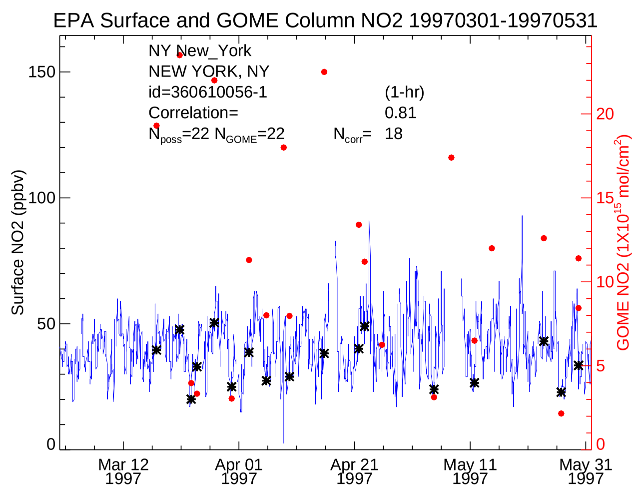
Insufficient Coincident Data

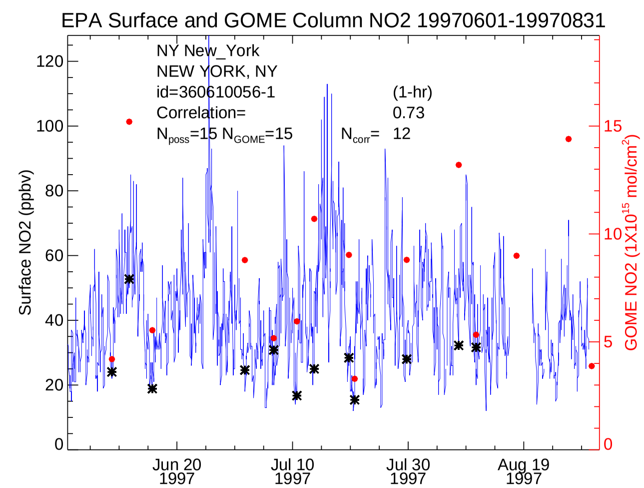
Summer (6/1/97-8/31/97)



Insufficient Coincident Data

Winter (12/1/96-2/28/97)



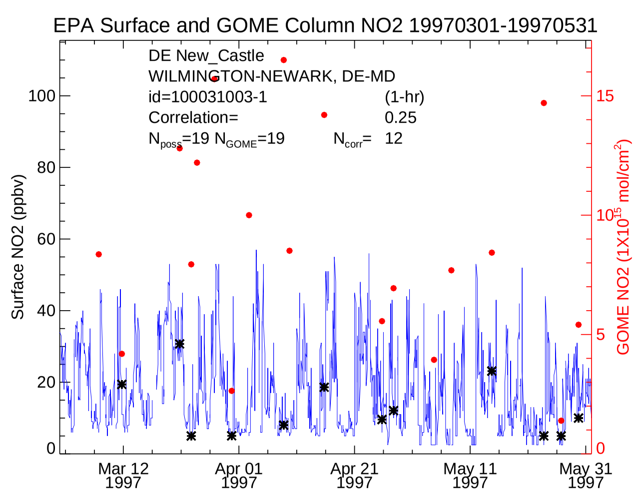


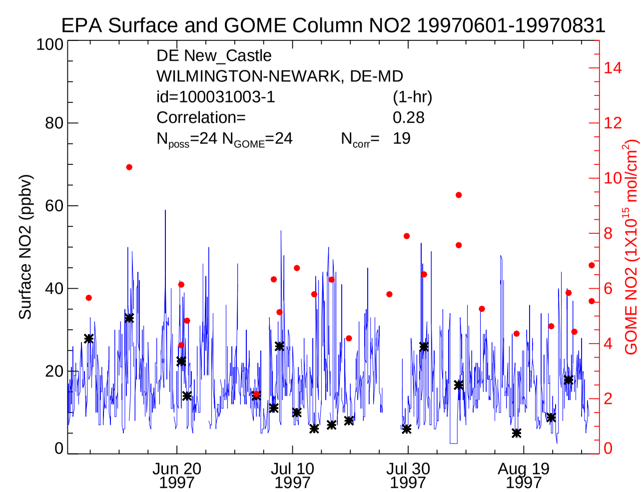
Insufficient Coincident Data

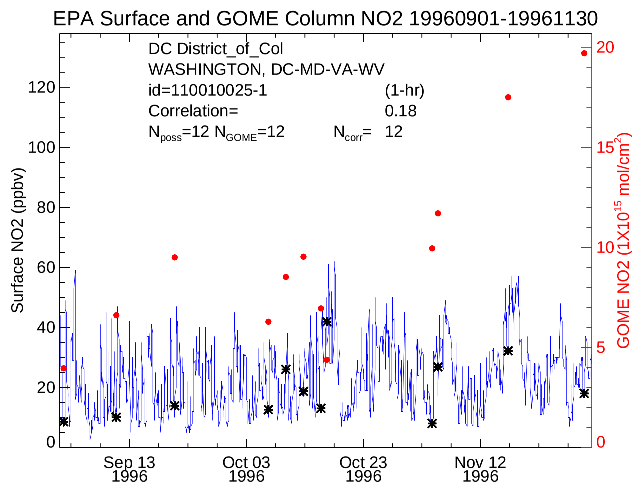
Fall (9/1/96-11/30/96)

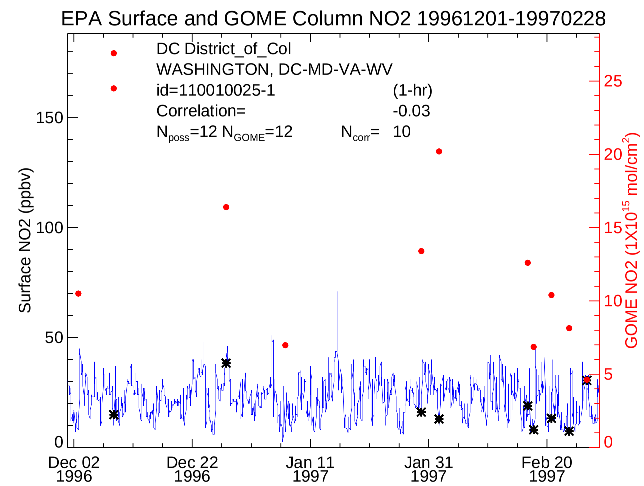
Insufficient Coincident Data

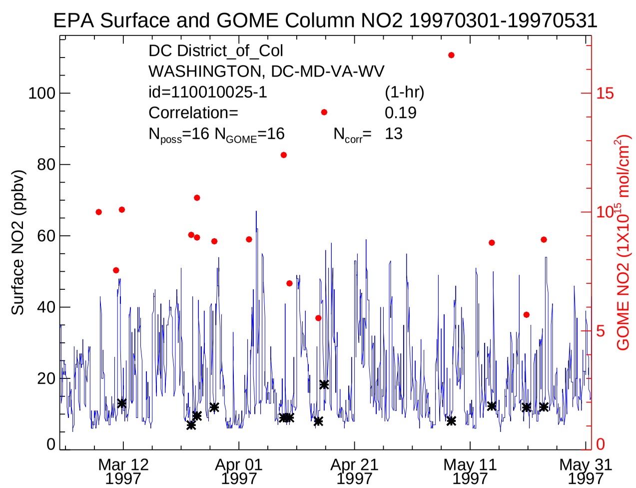
Winter (12/1/96-2/28/97)

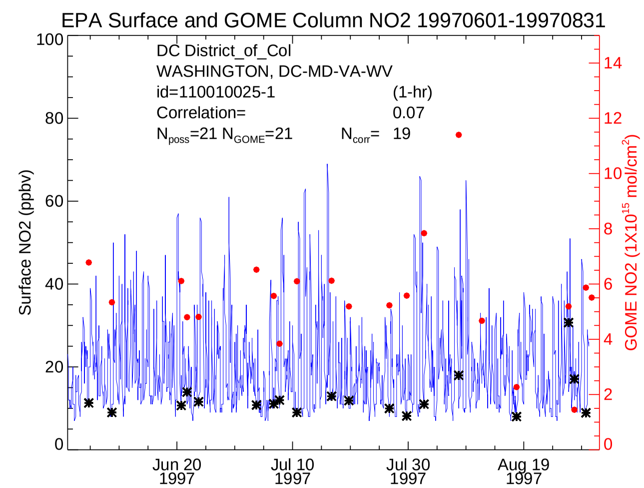


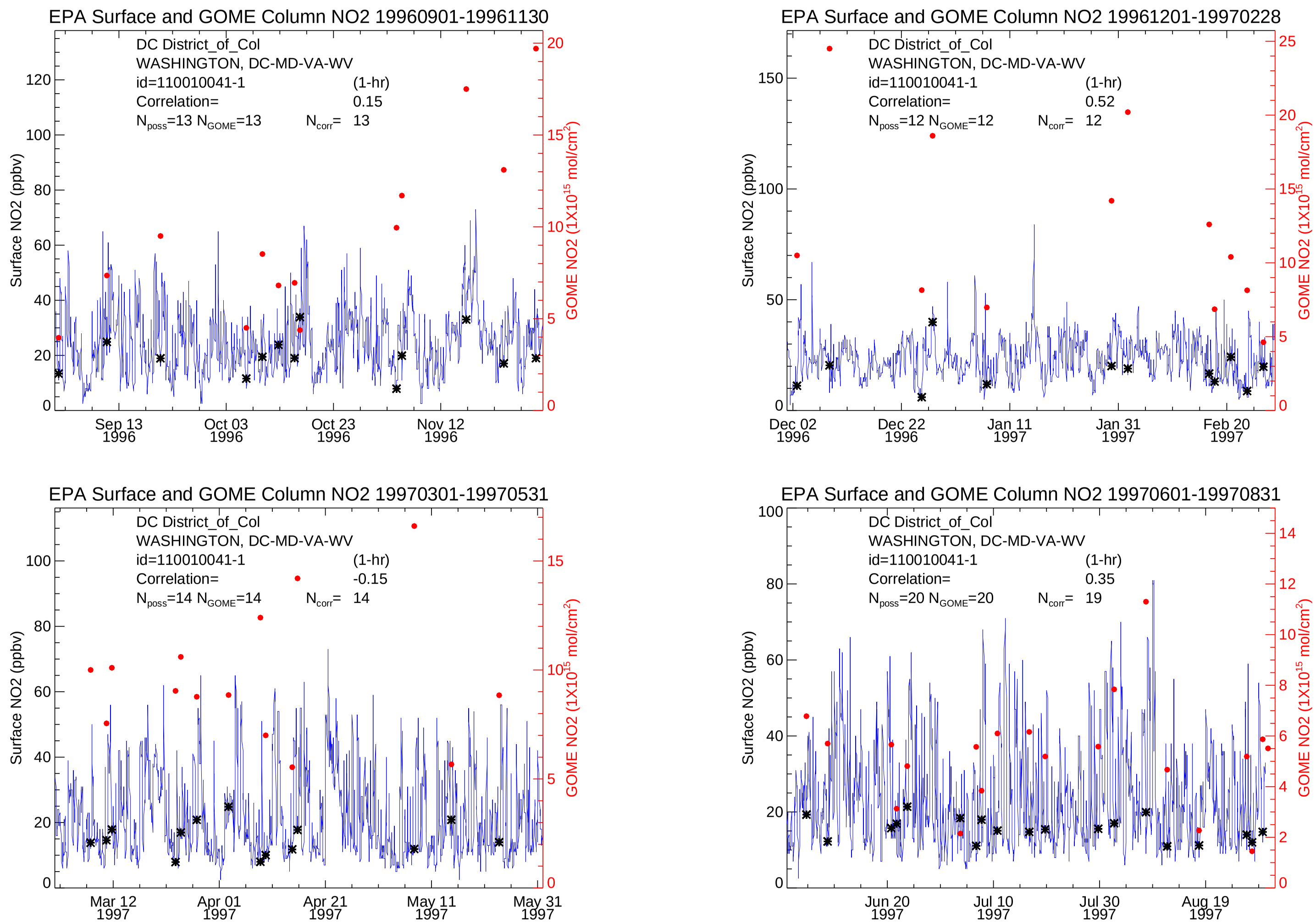



EPA Surface and GOME Column NO2 19960901-19961130
DC District_of_Col
WASHINGTON, DC-MD-VA-WV
id=110010025-1 (1-hr)
Correlation= 0.18
N_{poss}=12 N_{GOME}=12 N_{corr}= 12
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996


EPA Surface and GOME Column NO2 19961201-19970228
DC District_of_Col
WASHINGTON, DC-MD-VA-WV
id=110010025-1 (1-hr)
Correlation= -0.03
N_{poss}=12 N_{GOME}=12 N_{corr}= 10
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997


EPA Surface and GOME Column NO2 19970301-19970531
DC District_of_Col
WASHINGTON, DC-MD-VA-WV
id=110010025-1 (1-hr)
Correlation= 0.19
N_{poss}=16 N_{GOME}=16 N_{corr}= 13
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997


EPA Surface and GOME Column NO2 19970601-19970831
DC District_of_Col
WASHINGTON, DC-MD-VA-WV
id=110010025-1 (1-hr)
Correlation= 0.07
N_{poss}=21 N_{GOME}=21 N_{corr}= 19
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997


EPA Surface and GOME Column NO2 19960901-19961130
DC District_of_Col
WASHINGTON, DC-MD-VA-WV
id=110010041-1 (1-hr)
Correlation= 0.15
N_poss=13 N_GOME=13 N_corr= 13
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
EPA Surface and GOME Column NO2 19961201-19970228
DC District_of_Col
WASHINGTON, DC-MD-VA-WV
id=110010041-1 (1-hr)
Correlation= 0.52
N_poss=12 N_GOME=12 N_corr= 12
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
EPA Surface and GOME Column NO2 19970301-19970531
DC District_of_Col
WASHINGTON, DC-MD-VA-WV
id=110010041-1 (1-hr)
Correlation= -0.15
N_poss=14 N_GOME=14 N_corr= 14
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
EPA Surface and GOME Column NO2 19970601-19970831
DC District_of_Col
WASHINGTON, DC-MD-VA-WV
id=110010041-1 (1-hr)
Correlation= 0.35
N_poss=20 N_GOME=20 N_corr= 19
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

Insufficient Coincident Data

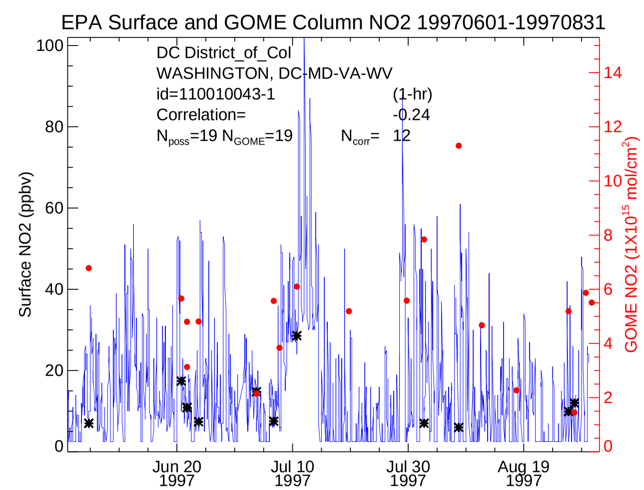
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



Insufficient Coincident Data

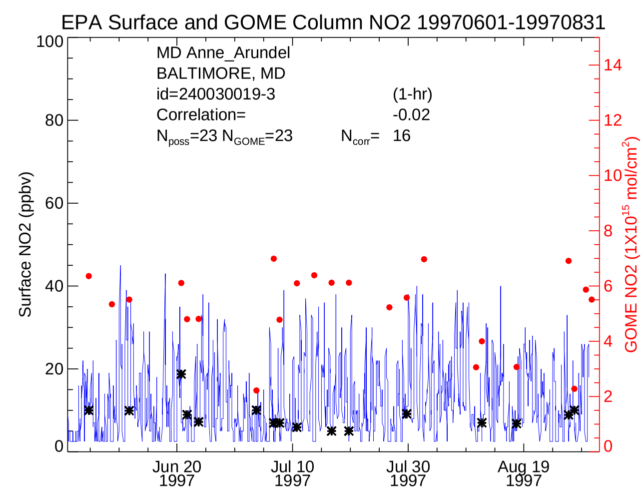
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



Insufficient Coincident Data

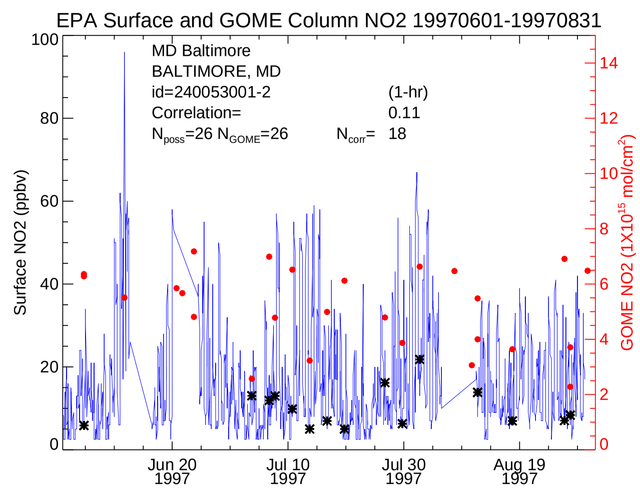
Fall (9/1/96-11/30/96)

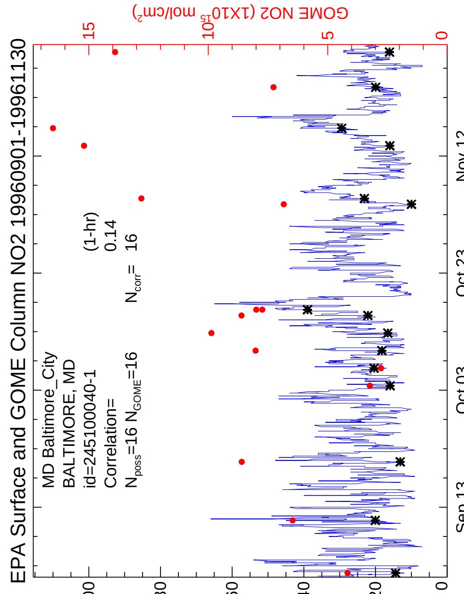
Insufficient Coincident Data

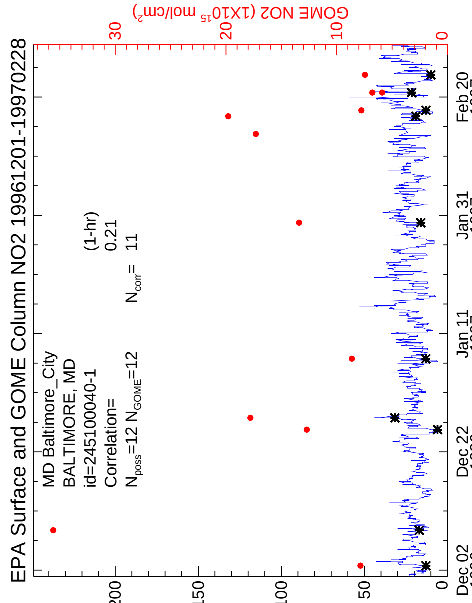
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)




EPA Surface and GOME Column NO2 19960901-19961130
MD Baltimore_City
BALTIMORE, MD
id=245100040-1
Correlation= (1-hr) 0.14
N_{poss}=16 N_{GOME}=16 N_{corr}= 16
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^{2})
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996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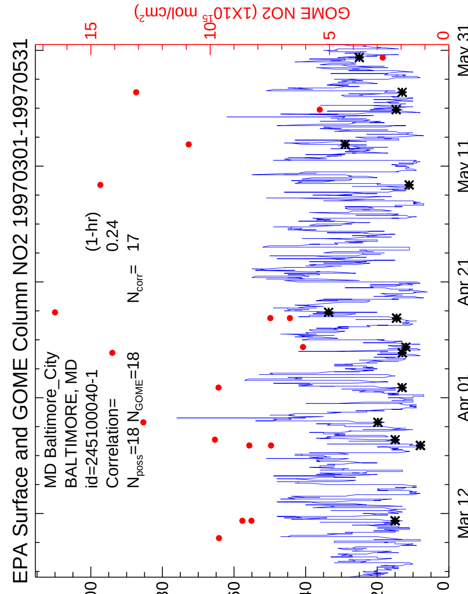
MD Baltimore_City
BALTIMORE, MD
id=245100040-1
Correlation= (1-hr) 0.21
N_{poss}=12 N_{GOME}=12 N_{corr}= 11
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^{2})
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997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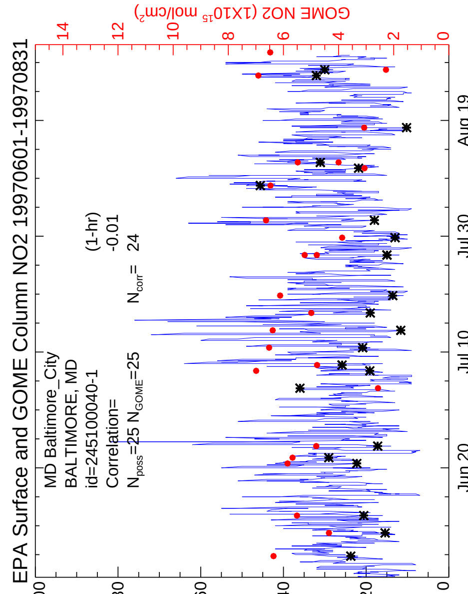
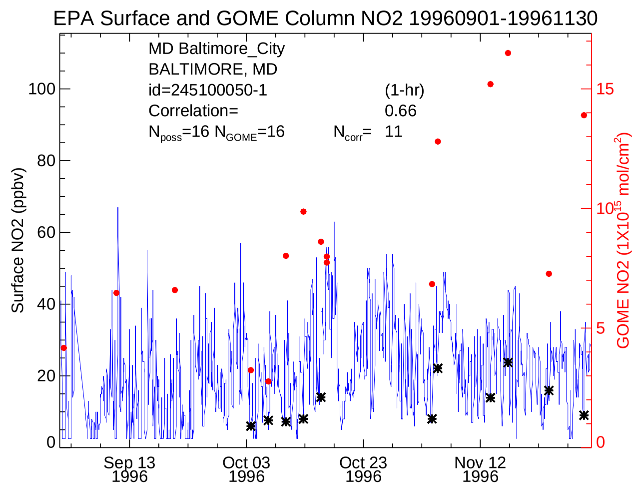
MD Baltimore_City
BALTIMORE, MD
id=245100040-1
Correlation= (1-hr) 0.24
N_{poss}=18 N_{GOME}=18 N_{corr}= 17
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^{2})
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997


EPA Surface and GOME Column NO2 19970601-19970831
MD Baltimore_City
BALTIMORE, MD
id=245100040-1
Correlation= (1-hr) -0.01
N_{poss}=25 N_{GOME}=25 N_{corr}= 24
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^{2})
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997



Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

Insufficient Coincident Data

Summer (6/1/97-8/31/97)

Insufficient Coincident Data

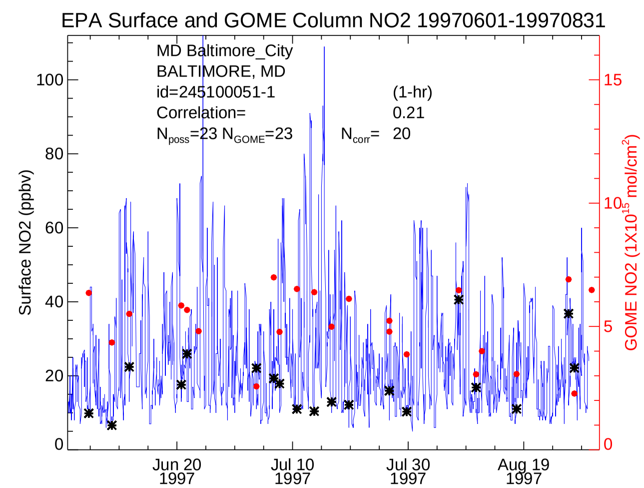
Fall (9/1/96-11/30/96)

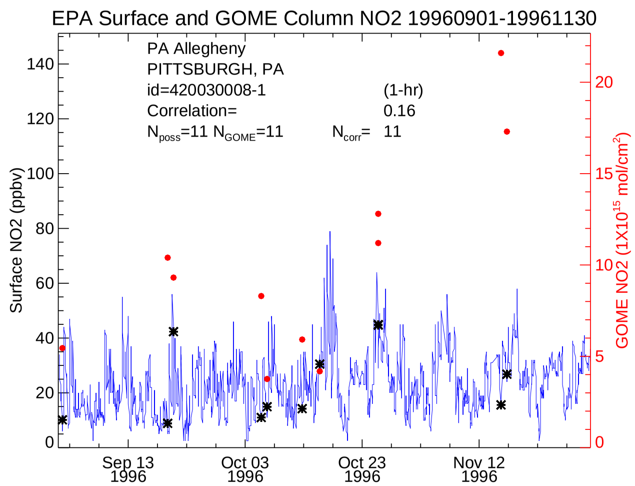
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

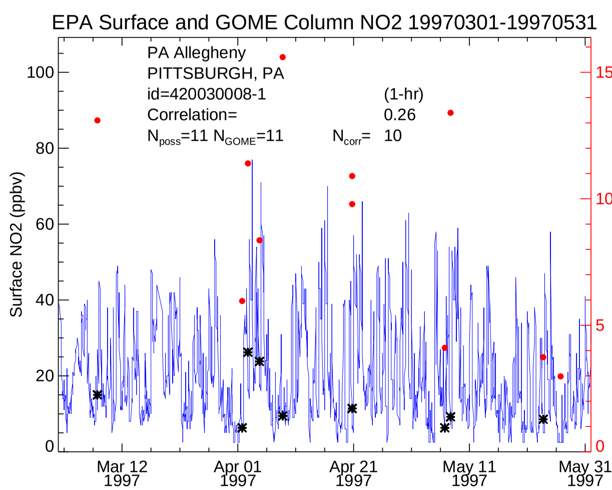
Spring (3/1/97-5/31/97)

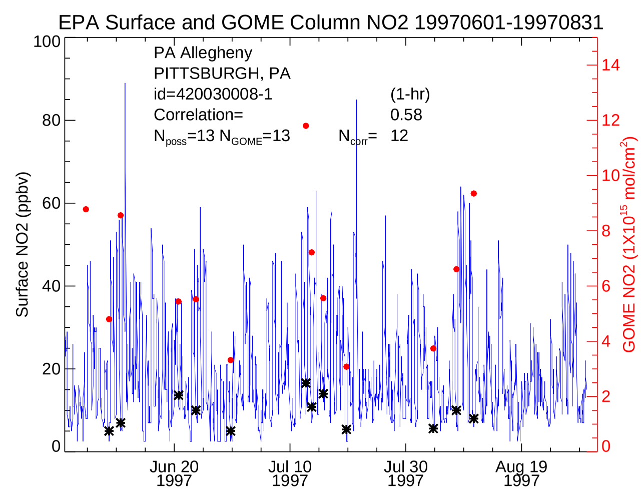


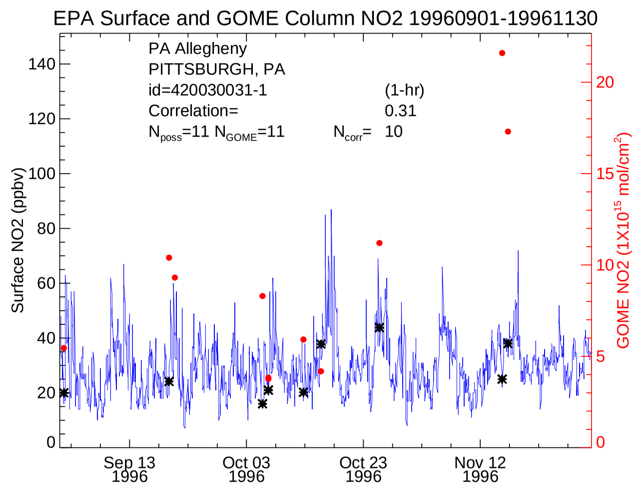


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

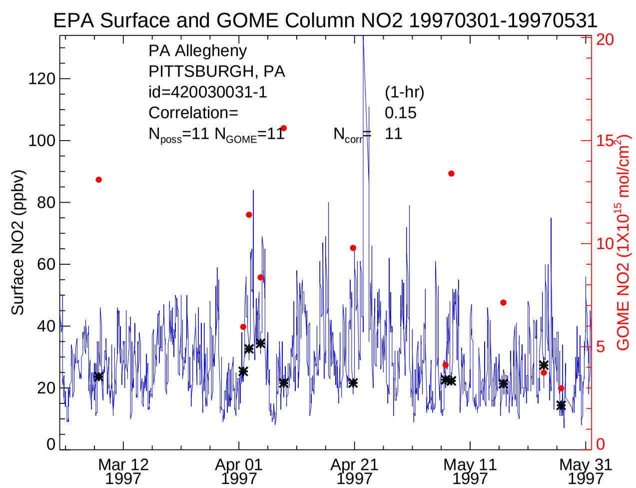


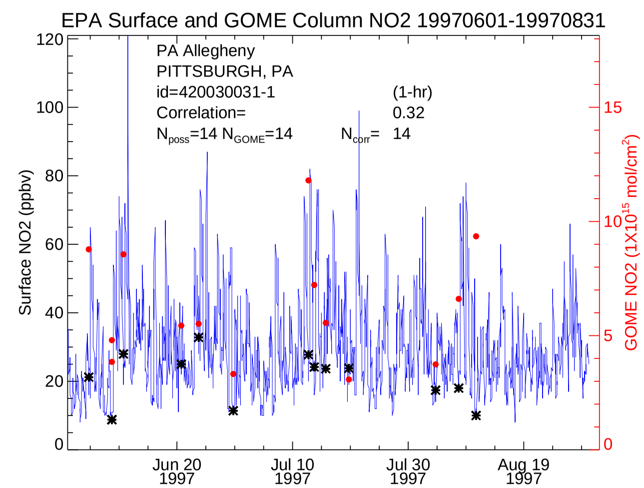


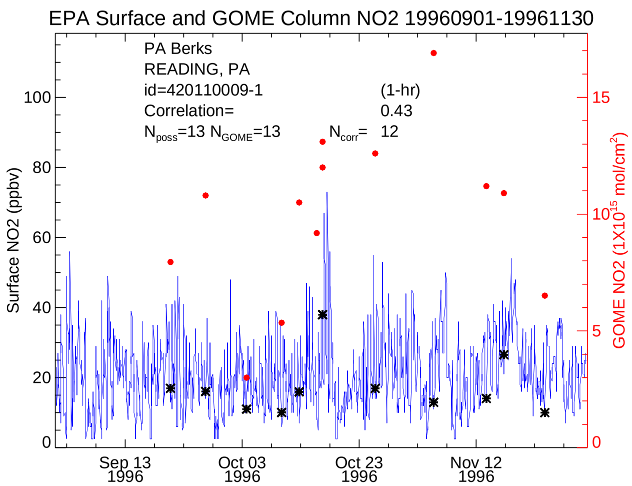


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

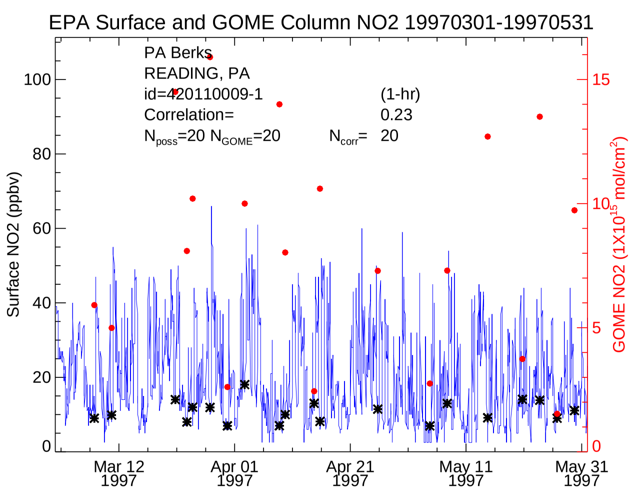


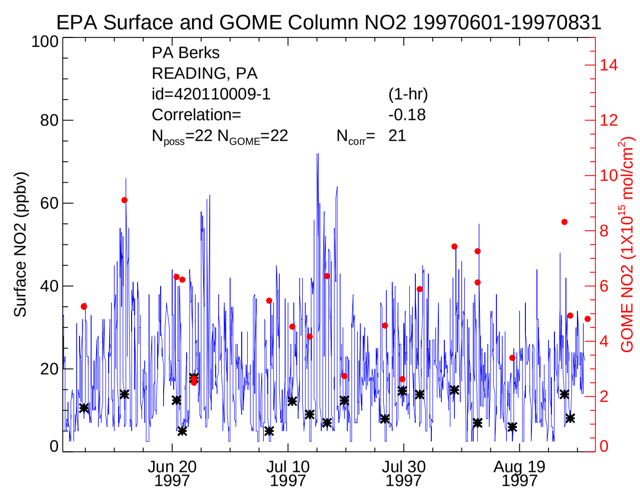


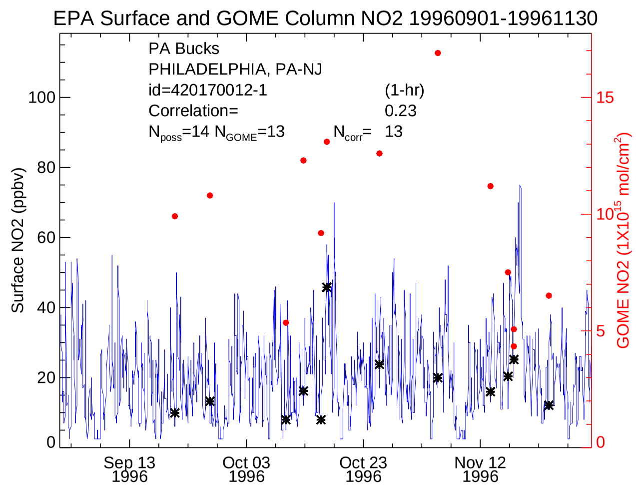


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

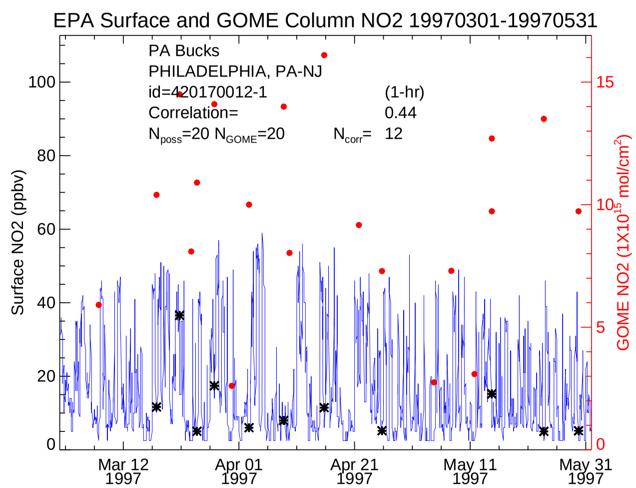


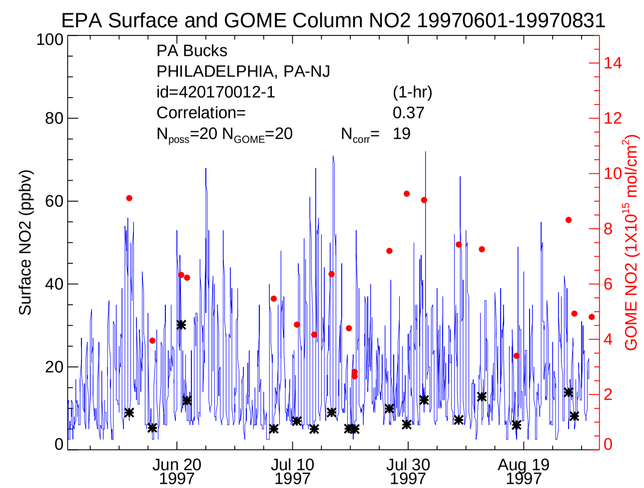




Insufficient Coincident Data

Winter (12/1/96-2/28/97)



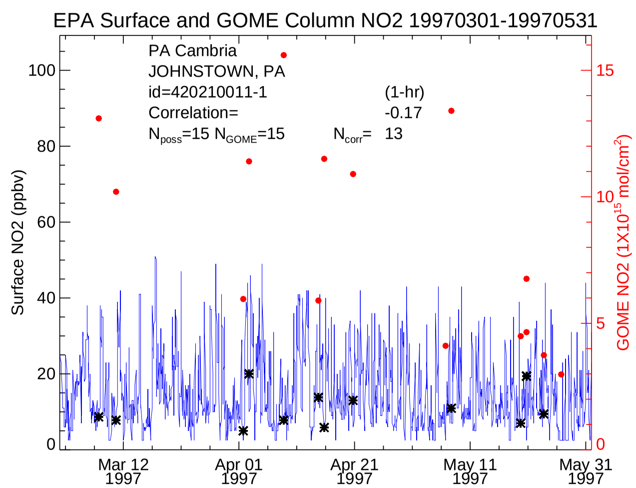


Insufficient Coincident Data

Fall (9/1/96-11/30/96)

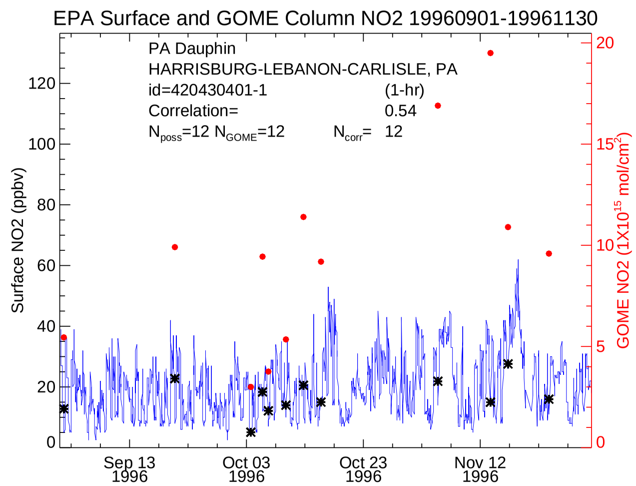
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



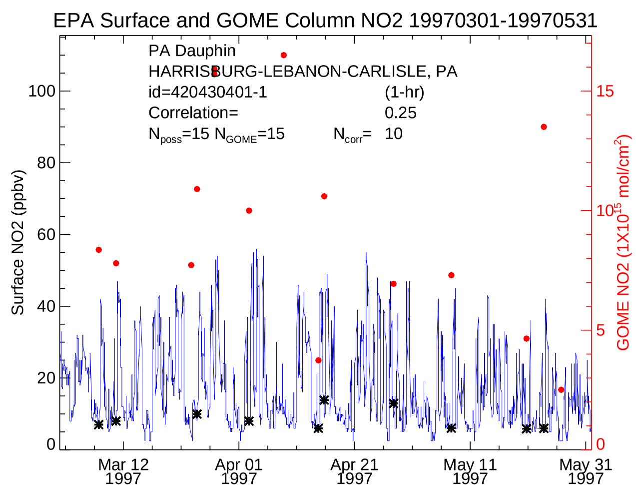
Insufficient Coincident Data

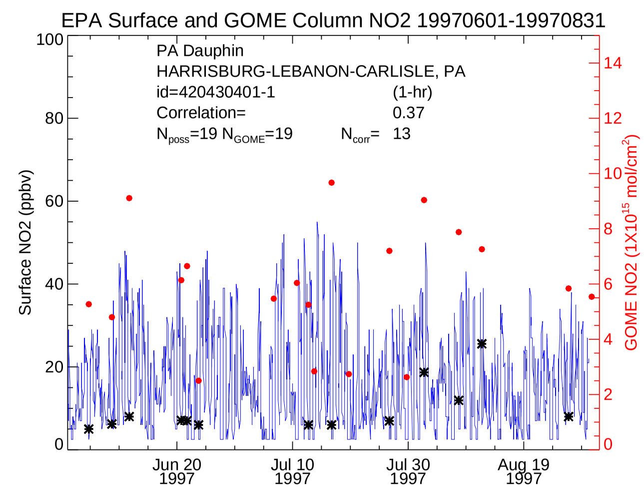
Summer (6/1/97-8/31/97)



Insufficient Coincident Data

Winter (12/1/96-2/28/97)



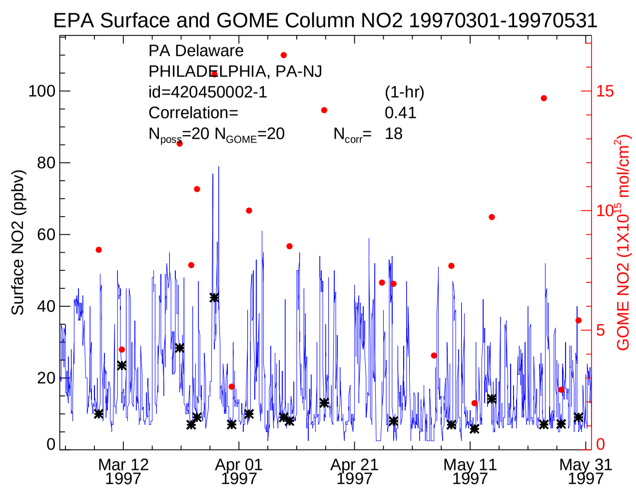


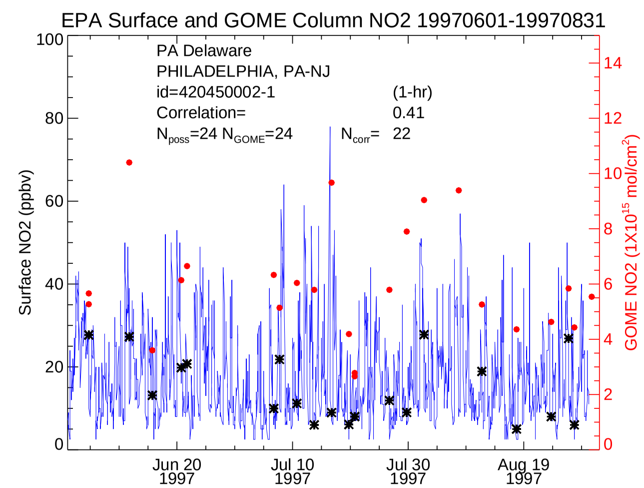
Insufficient Coincident Data

Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)



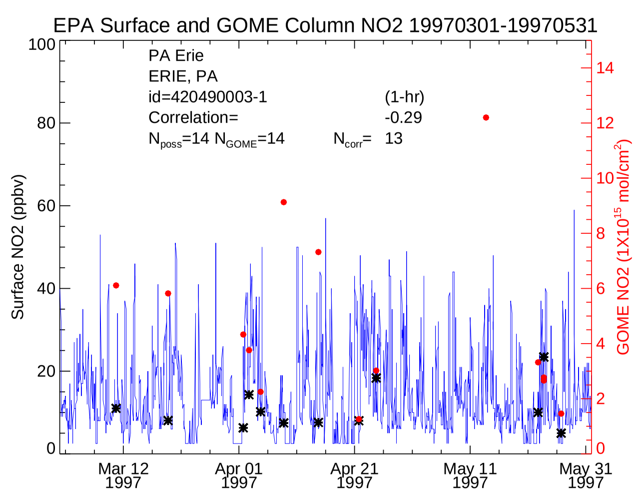


Insufficient Coincident Data

Fall (9/1/96-11/30/96)

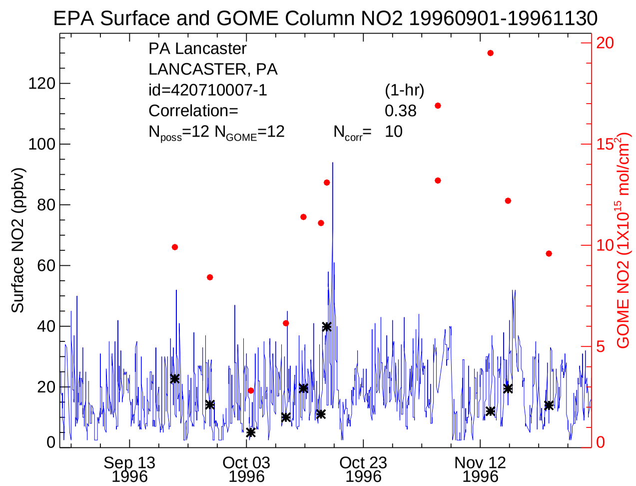
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



Insufficient Coincident Data

Summer (6/1/97-8/31/97)

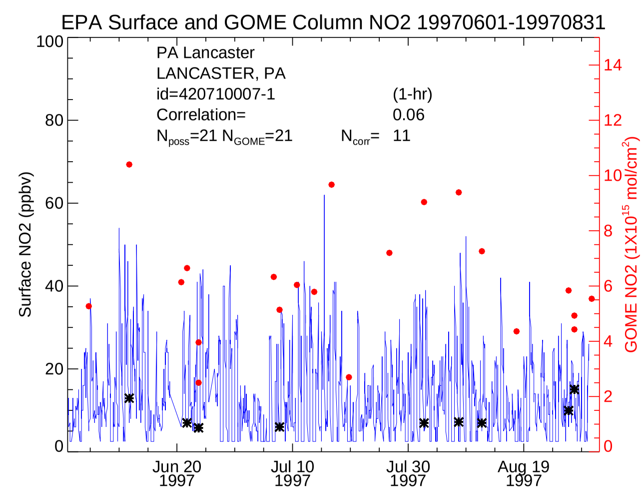


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

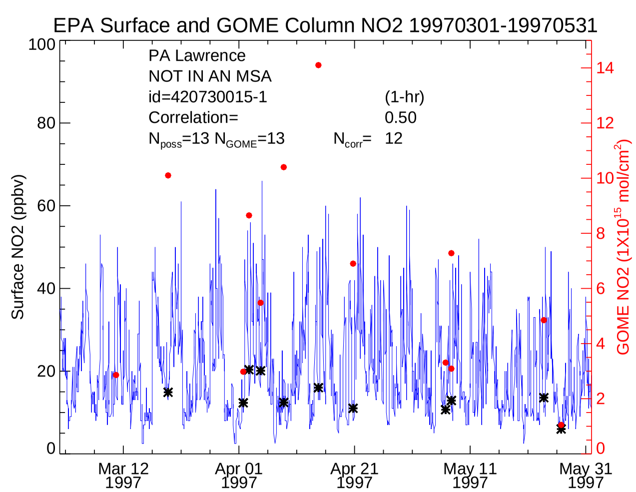


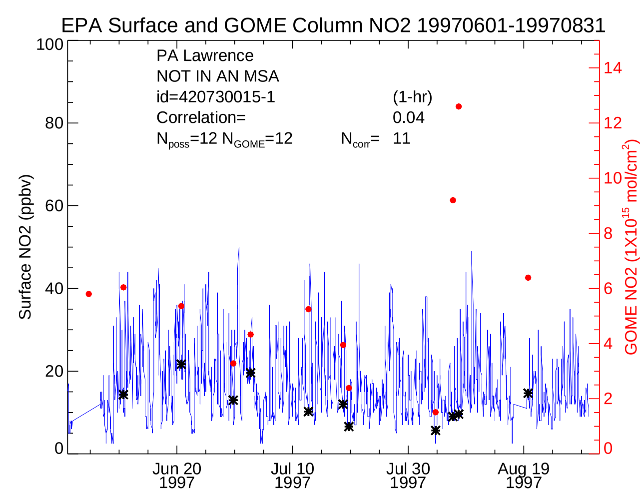
Insufficient Coincident Data

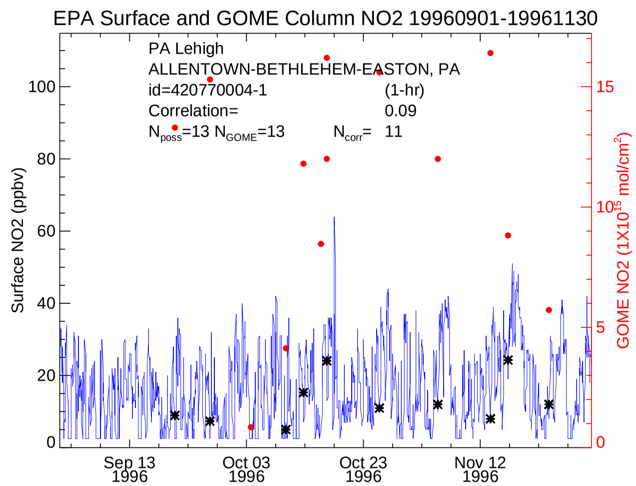
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)





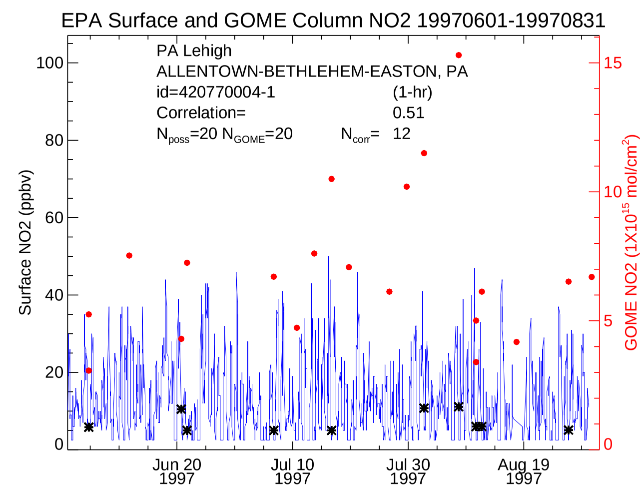


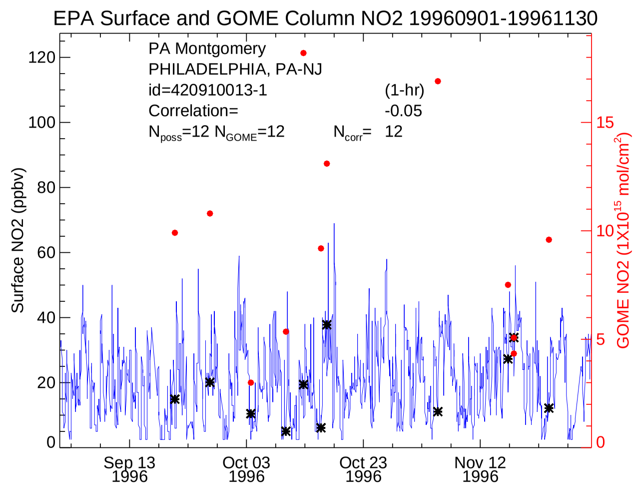
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

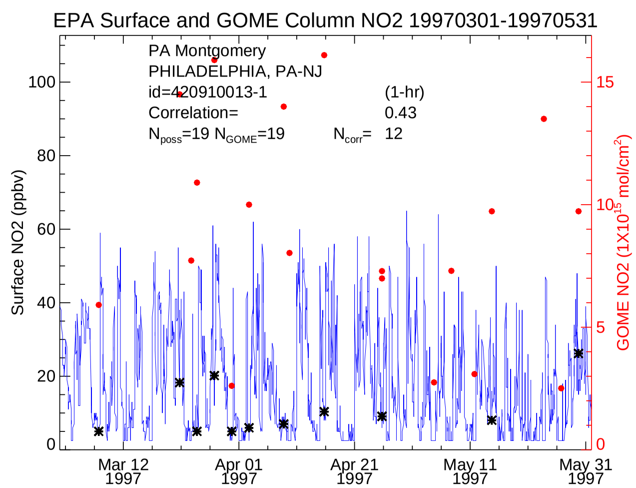
Spring (3/1/97-5/31/97)

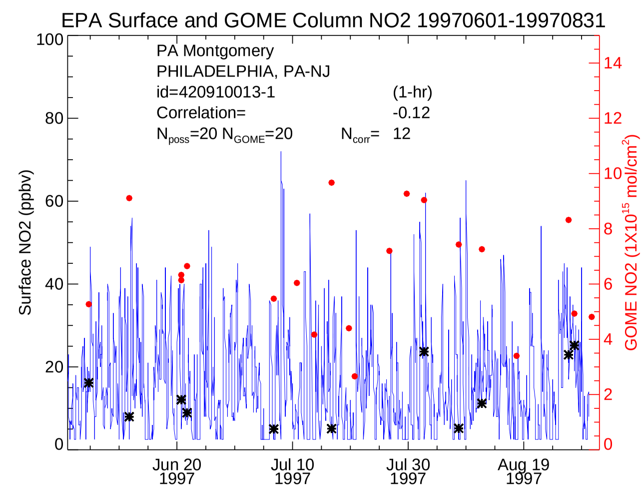


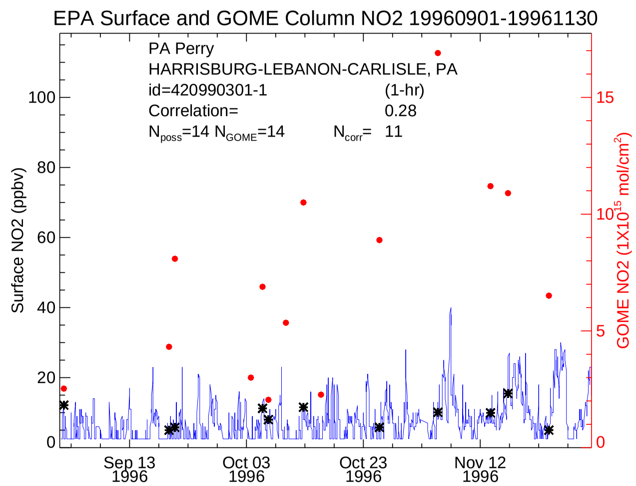


Insufficient Coincident Data

Winter (12/1/96-2/28/97)







Insufficient Coincident Data

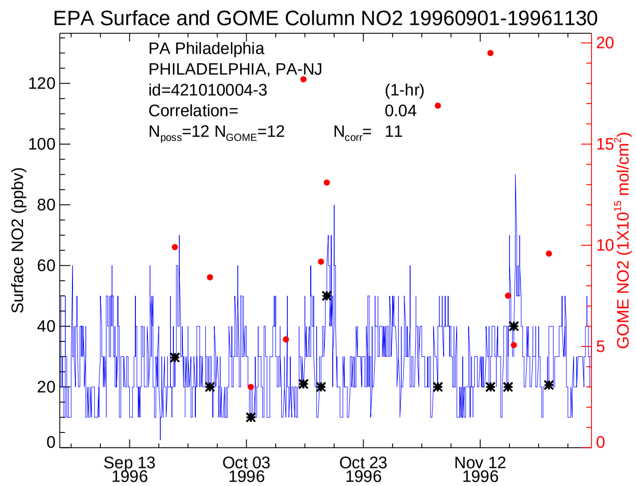
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

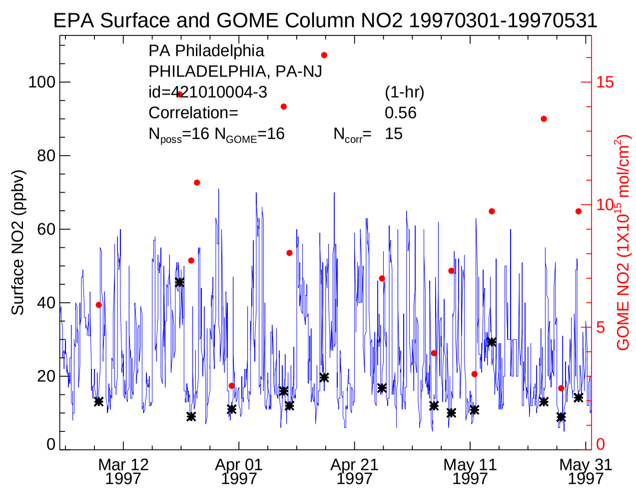
Insufficient Coincident Data

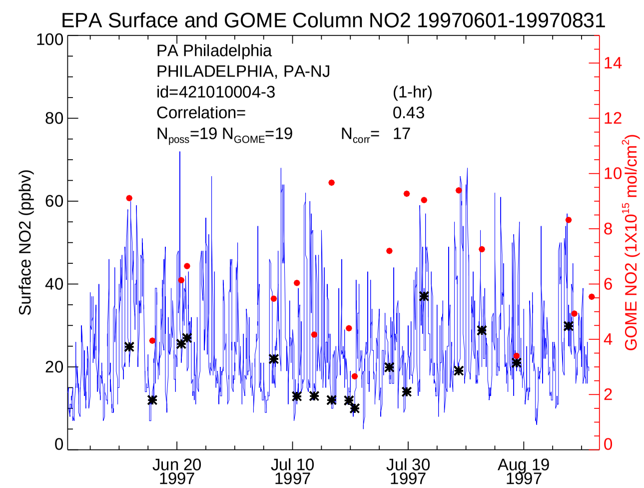
Summer (6/1/97-8/31/97)

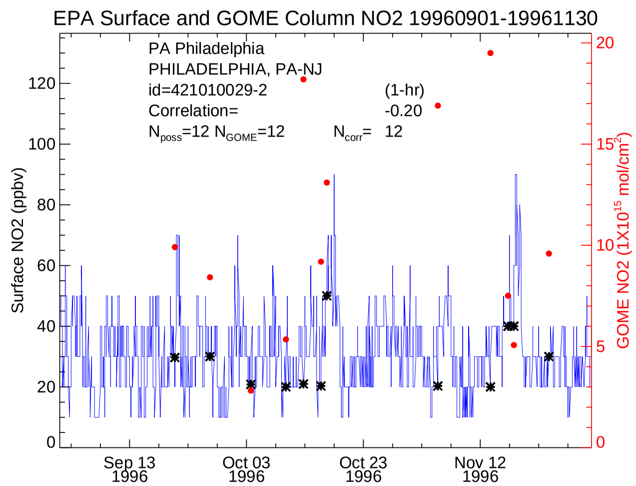


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

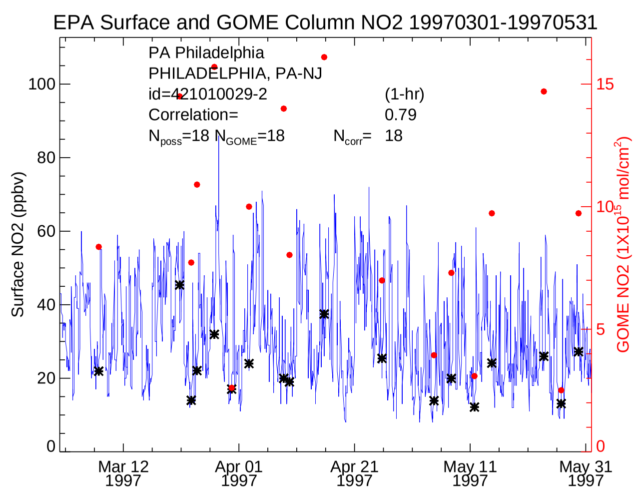


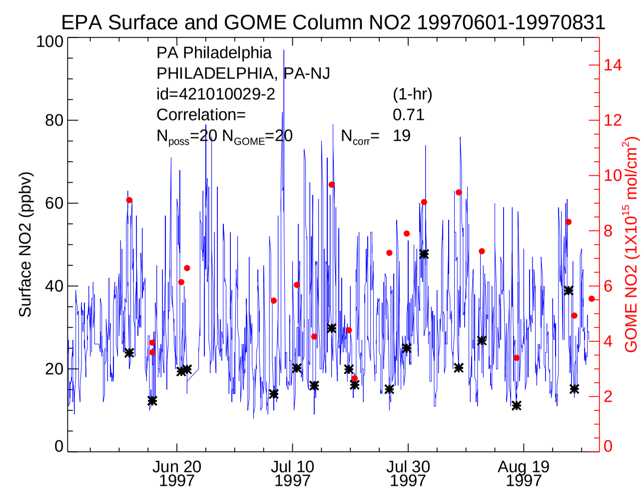


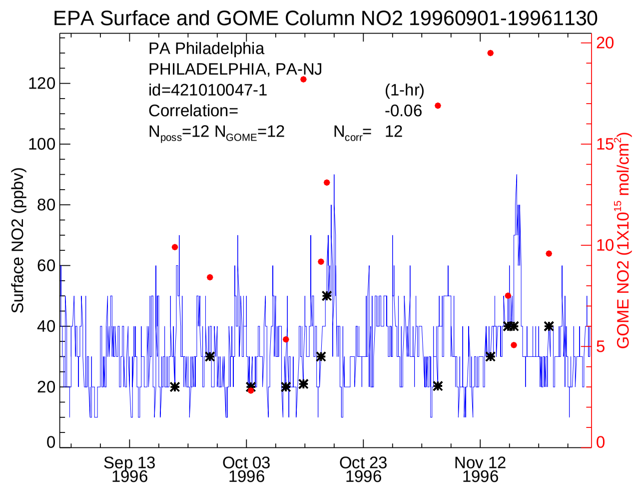


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

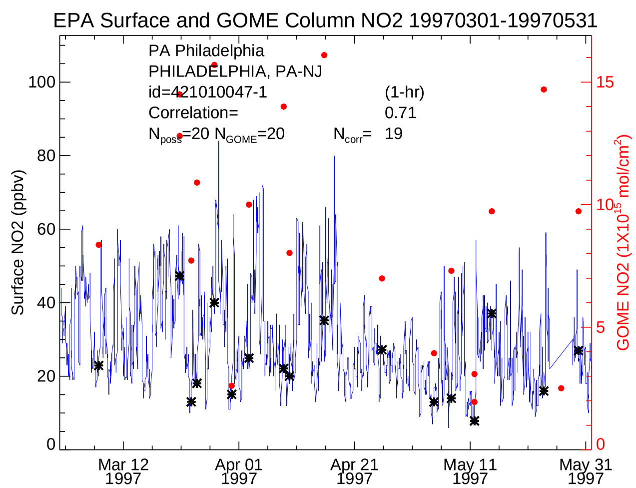


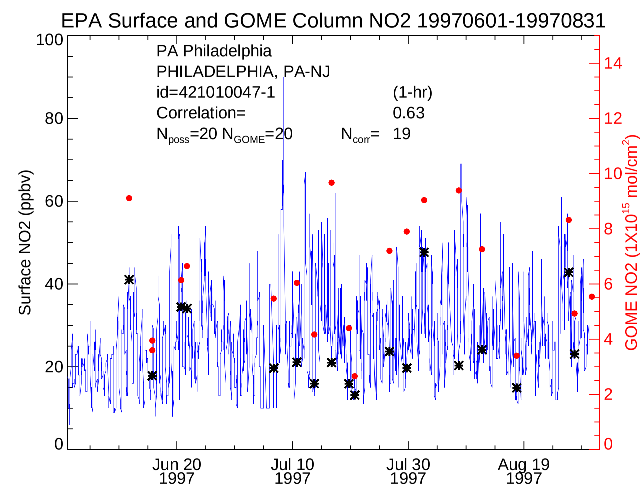


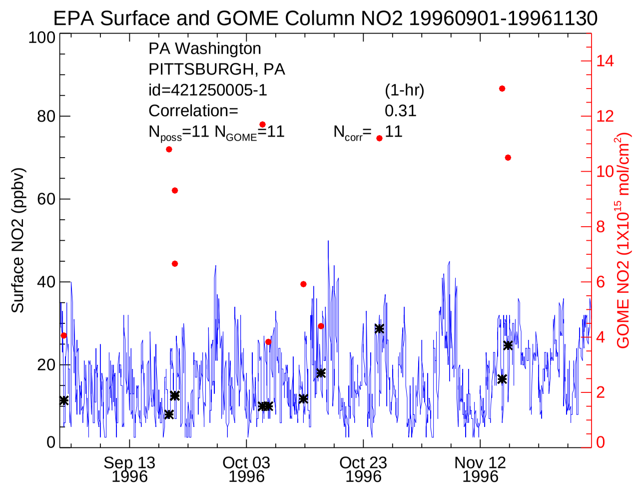


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

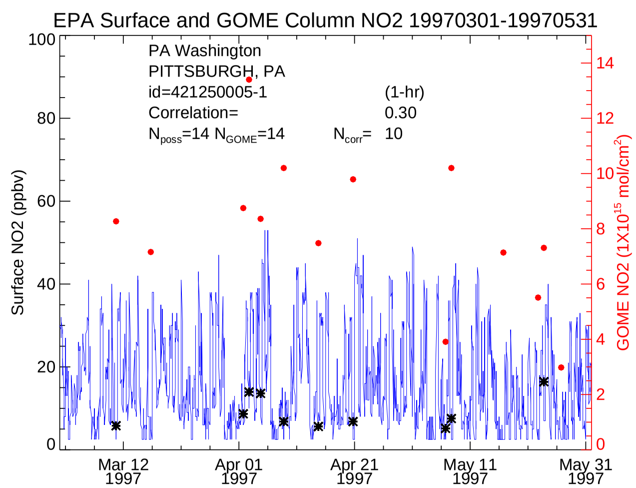


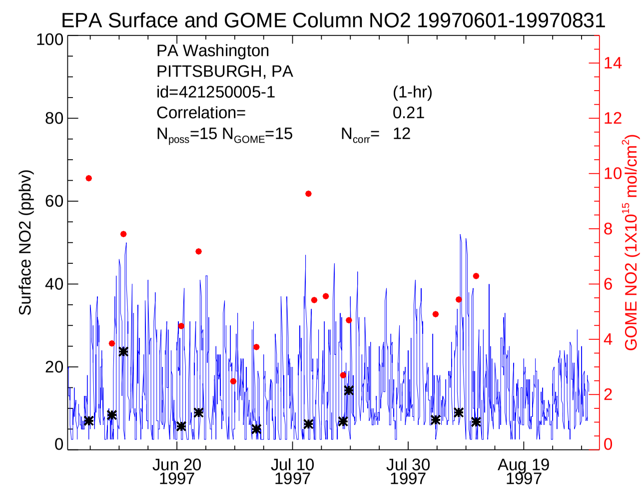




Insufficient Coincident Data

Winter (12/1/96-2/28/97)



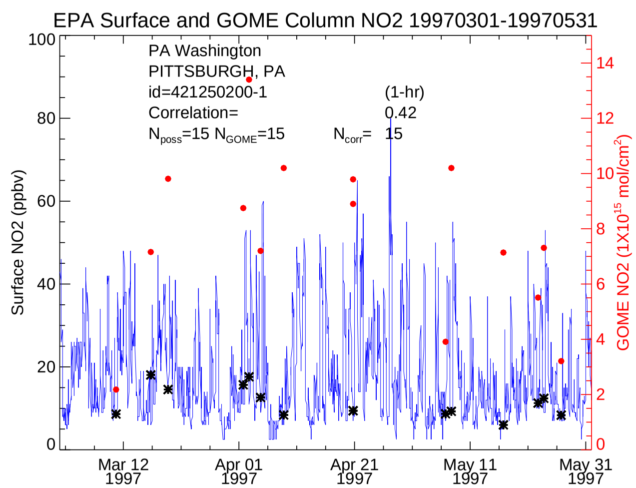


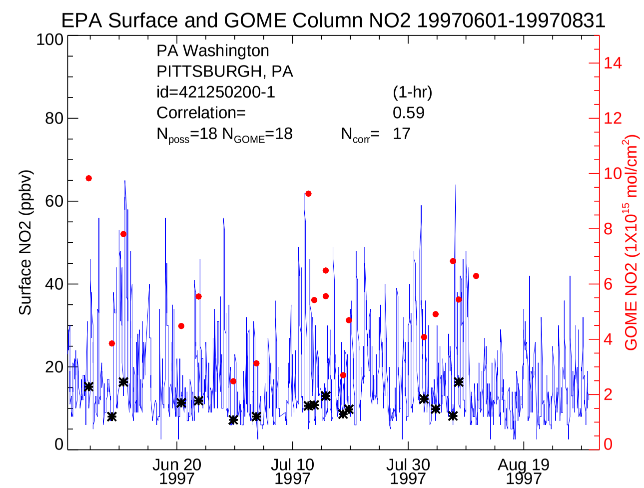
Insufficient Coincident Data

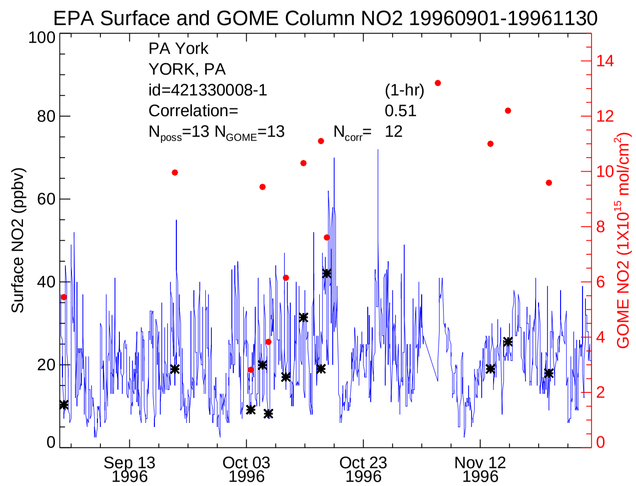
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

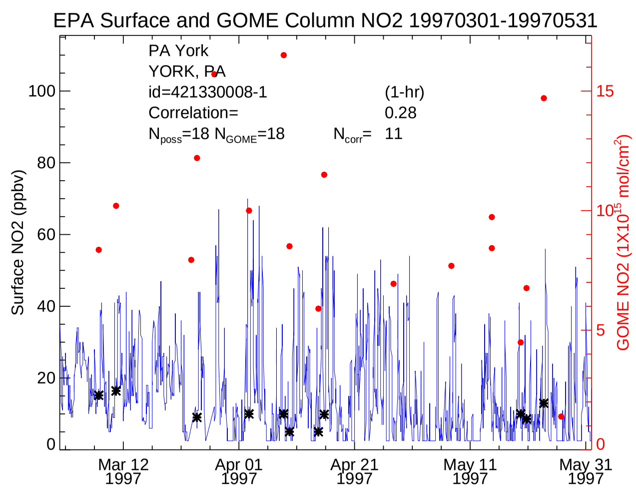


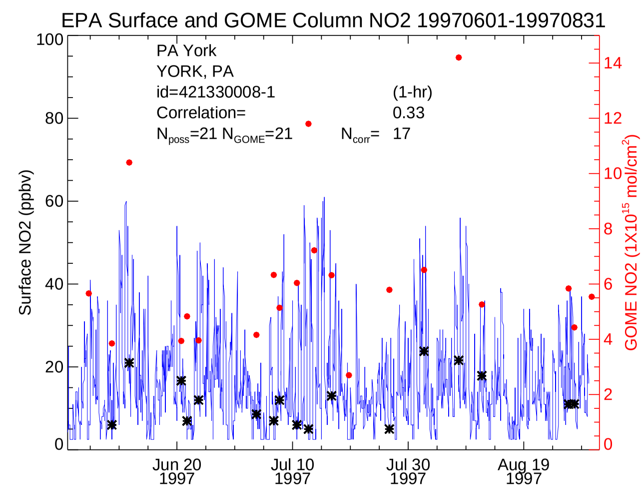


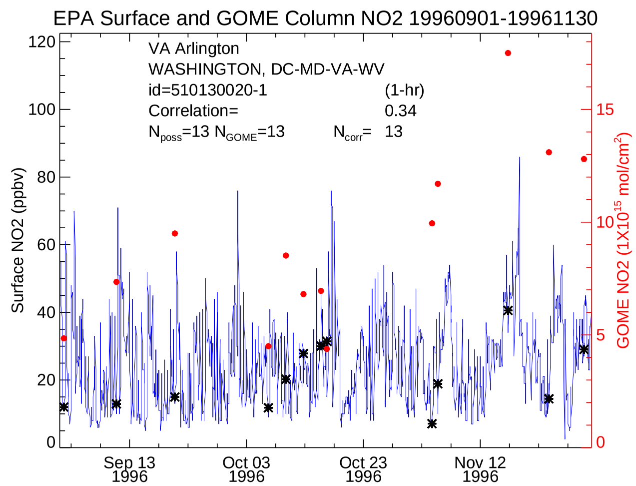


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

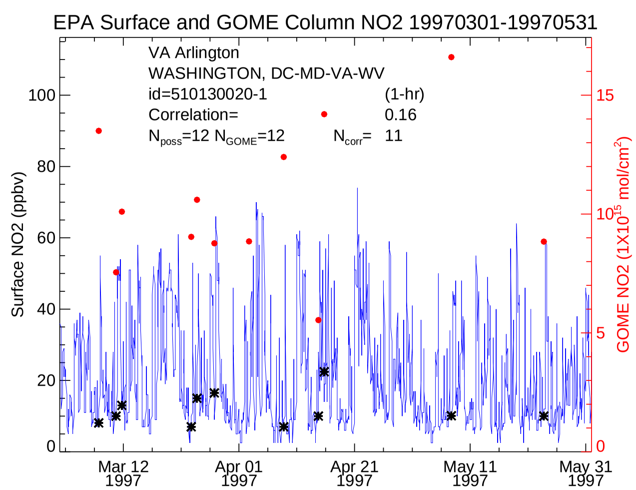


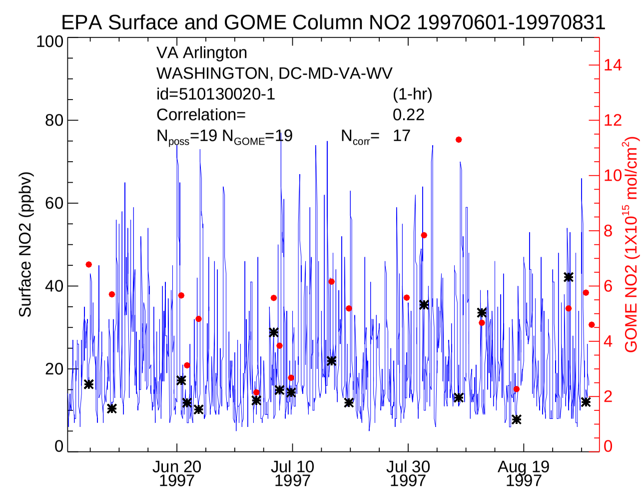




Insufficient Coincident Data

Winter (12/1/96-2/28/97)



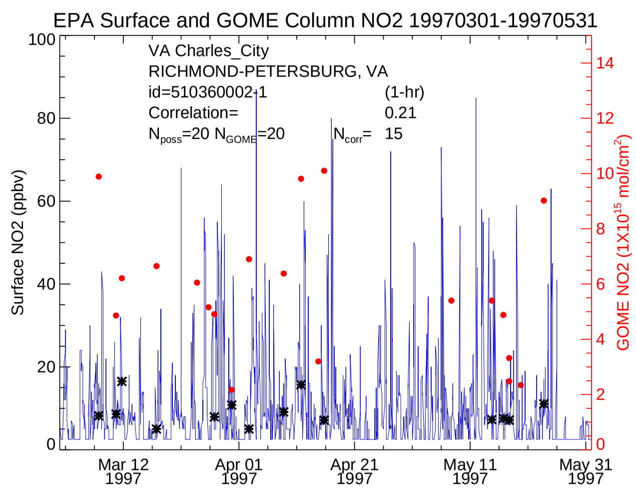


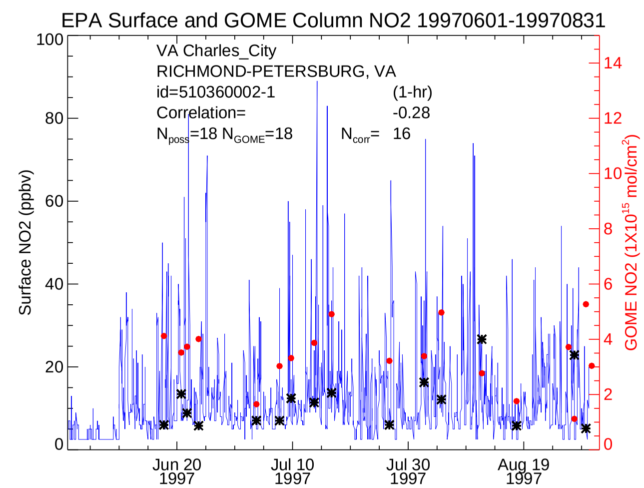
Insufficient Coincident Data

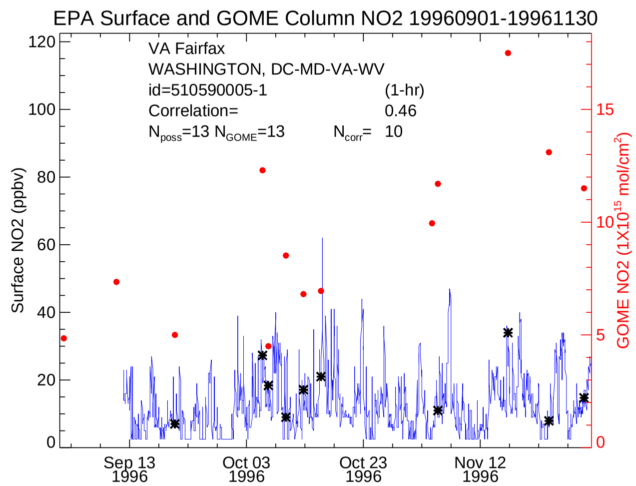
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)





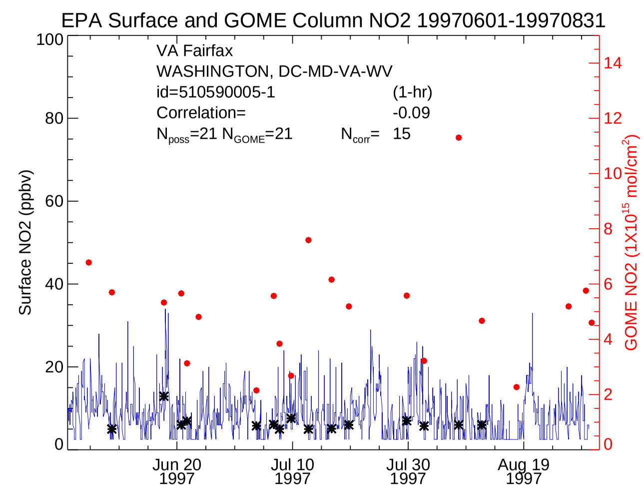


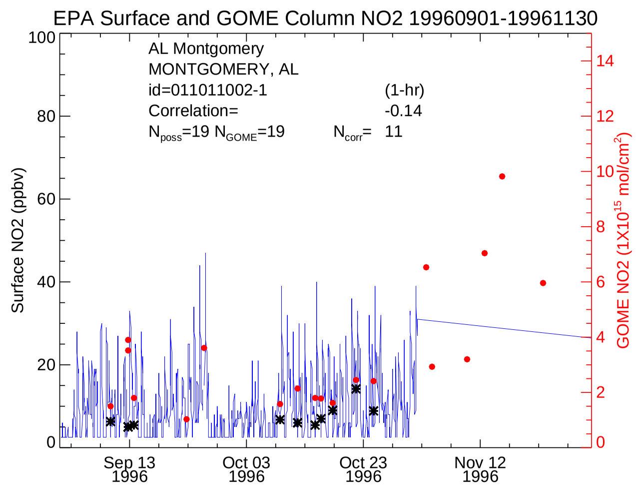
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

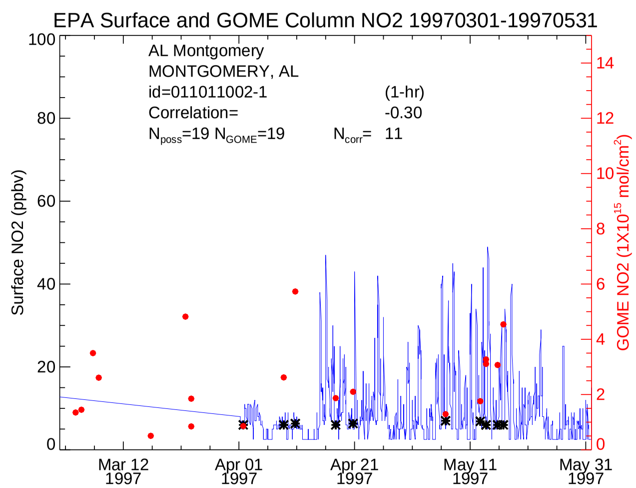
Spring (3/1/97-5/31/97)





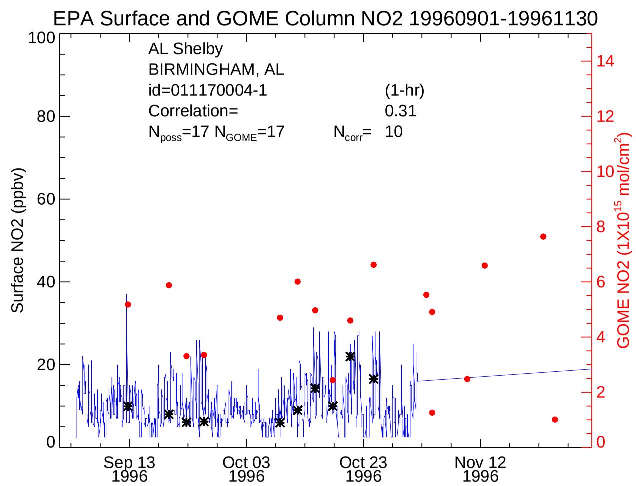
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



Insufficient Coincident Data

Summer (6/1/97-8/31/97)



Insufficient Coincident Data

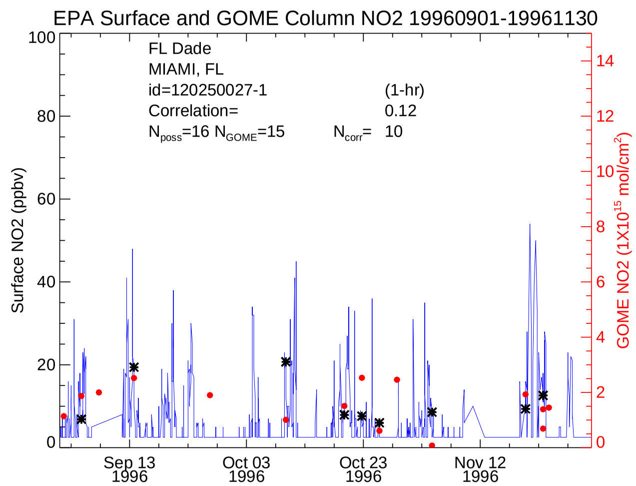
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

Insufficient Coincident Data

Summer (6/1/97-8/31/97)



Insufficient Coincident Data

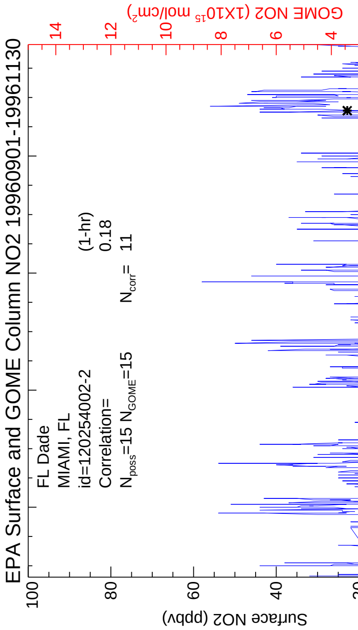
Winter (12/1/96-2/28/97)

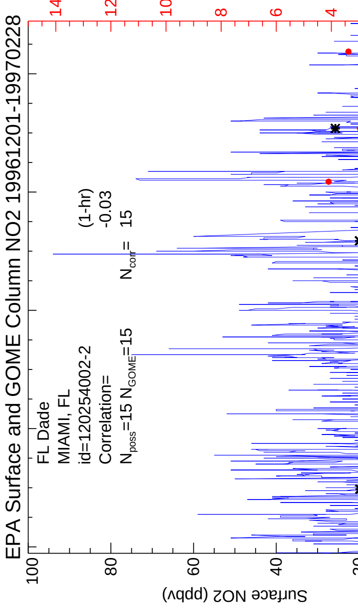
Insufficient Coincident Data

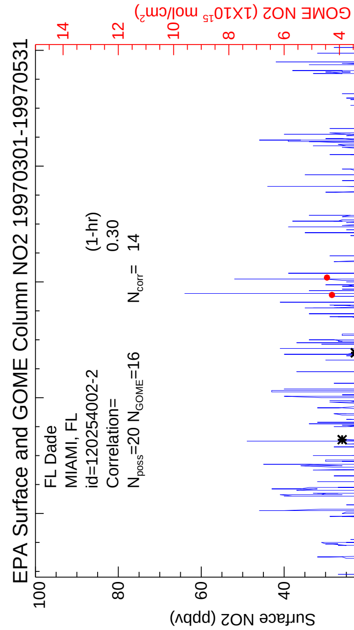
Spring (3/1/97-5/31/97)

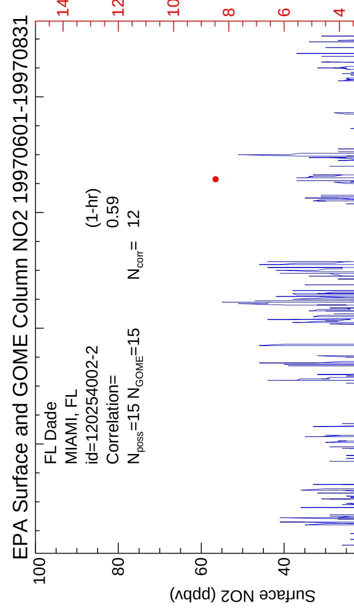
Insufficient Coincident Data

Summer (6/1/97-8/31/97)

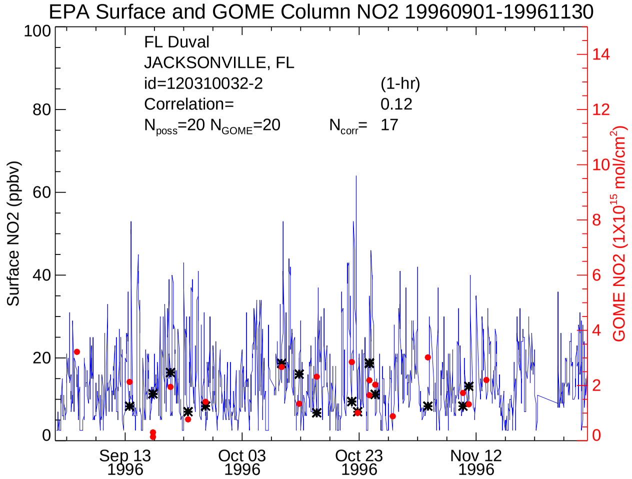

EPA Surface and GOME Column NO2 19960901-19961130
FL Dade
MIAMI, FL
id=120254002-2
Correlation= (1-hr) 0.18
N_{poss}=15 N_{GOME}=15 N_{corr}= 11
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996


EPA Surface and GOME Column NO2 19961201-19970228
FL Dade
MIAMI, FL
id=120254002-2
Correlation= (1-hr) -0.03
N_{poss}=15 N_{GOME}=15 N_{corr}= 15
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997


EPA Surface and GOME Column NO2 19970301-19970531
FL Dade
MIAMI, FL
id=120254002-2
Correlation= (1-hr) 0.30
N_{poss}=20 N_{GOME}=16 N_{corr}= 14
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997


EPA Surface and GOME Column NO2 19970601-19970831
FL Dade
MIAMI, FL
id=120254002-2
Correlation= (1-hr) 0.59
N_{poss}=15 N_{GOME}=15 N_{corr}= 12
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

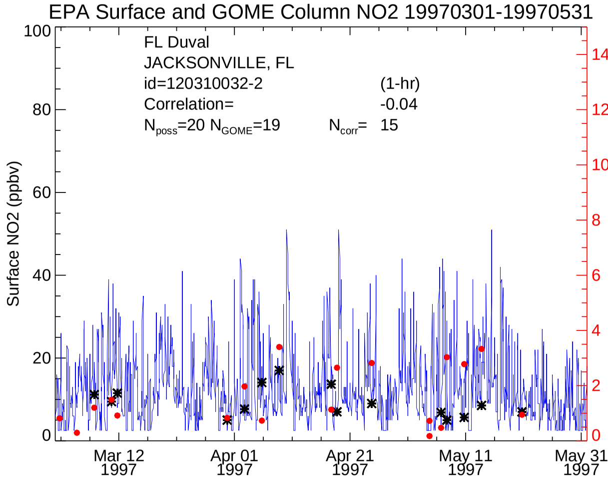
EPA Surface and GOME Column NO2 19960901-19961130



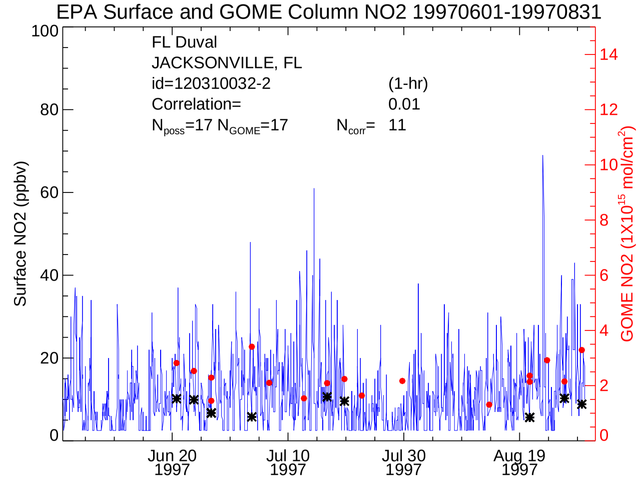
Insufficient Coincident Data

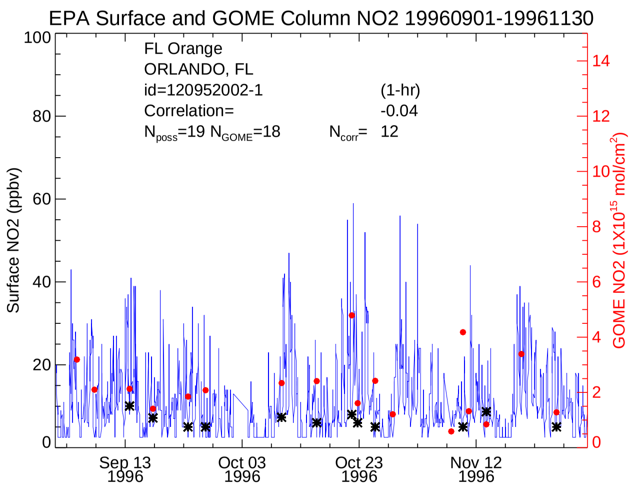
Winter (12/1/96-2/28/97)

EPA Surface and GOME Column NO2 19970301-19970531



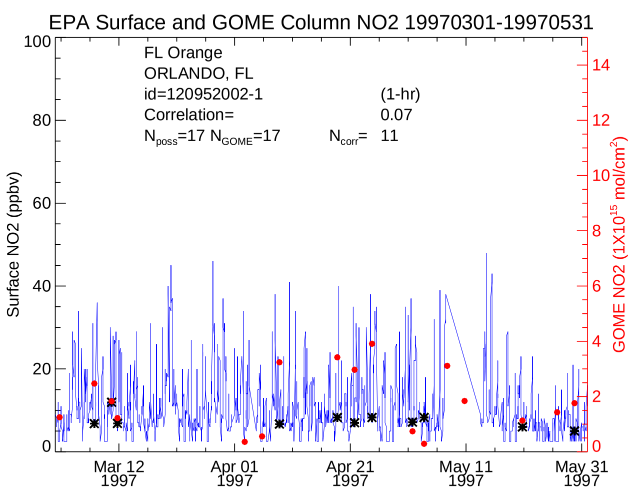
EPA Surface and GOME Column NO2 19970601-19970831

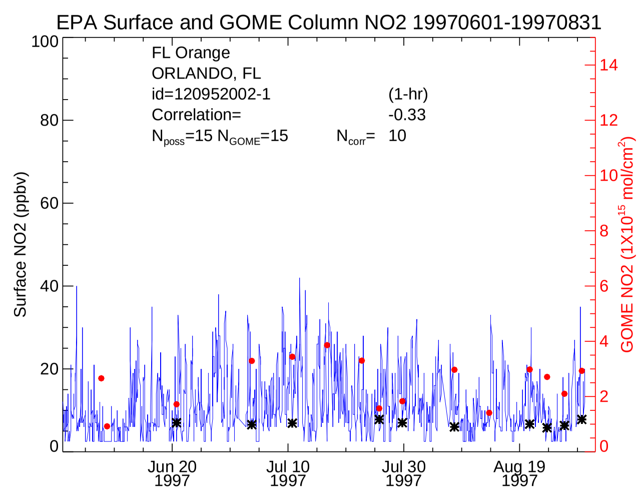


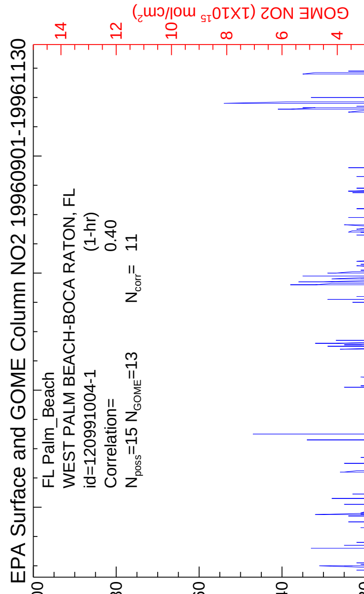


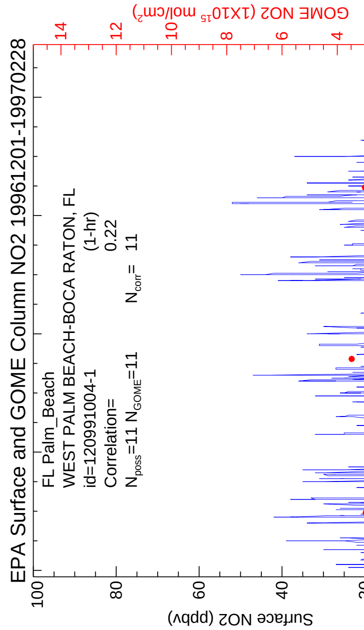
Insufficient Coincident Data

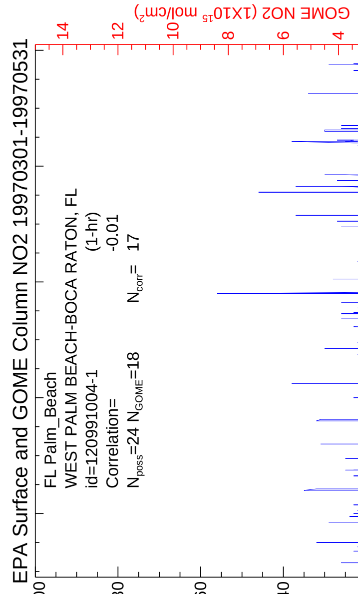
Winter (12/1/96-2/28/97)

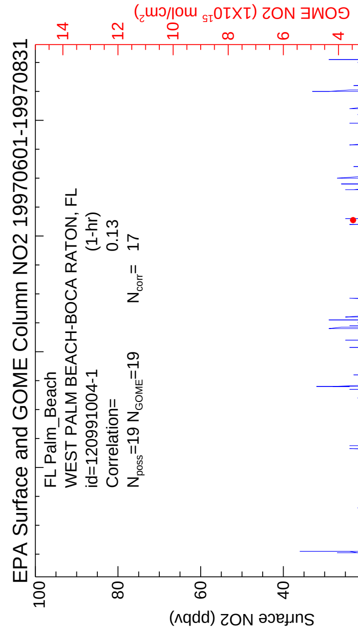


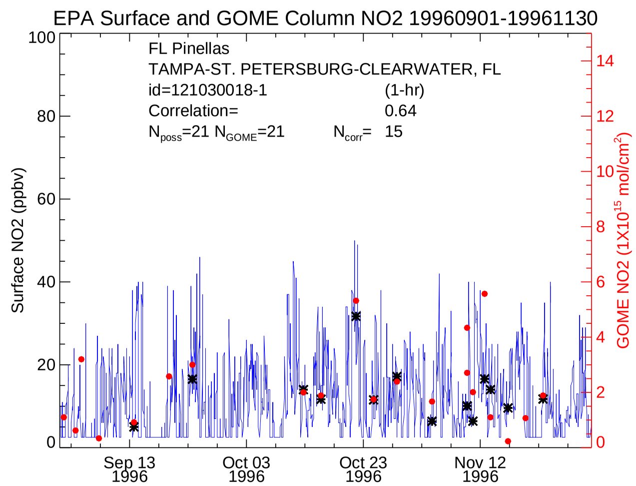



EPA Surface and GOME Column NO2 19960901-19961130
FL Palm_Beach
WEST PALM BEACH-BOCA RATON, FL
id=120991004-1
(1-hr)
Correlation= 0.40
N_poss=15 N_GOME=13
N_corr= 11
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996


EPA Surface and GOME Column NO2 19961201-19970228
FL Palm_Beach
WEST PALM BEACH-BOCA RATON, FL
id=120991004-1
(1-hr)
Correlation= 0.22
N_poss=11 N_GOME=11
N_corr= 11
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997


EPA Surface and GOME Column NO2 19970301-19970531
FL Palm_Beach
WEST PALM BEACH-BOCA RATON, FL
id=120991004-1
(1-hr)
Correlation= -0.01
N_poss=24 N_GOME=18
N_corr= 17
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997


EPA Surface and GOME Column NO2 19970601-19970831
FL Palm_Beach
WEST PALM BEACH-BOCA RATON, FL
id=120991004-1
(1-hr)
Correlation= 0.13
N_poss=19 N_GOME=19
N_corr= 17
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997



Insufficient Coincident Data

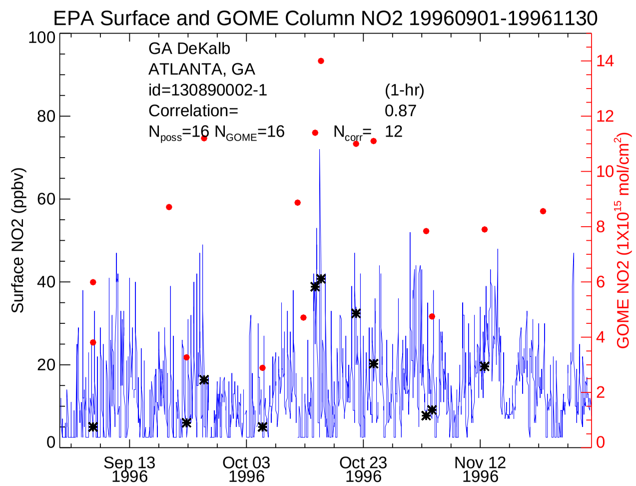
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

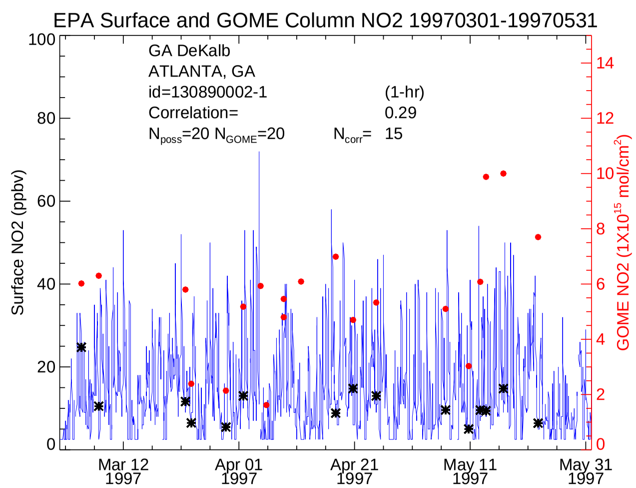
Insufficient Coincident Data

Summer (6/1/97-8/31/97)



Insufficient Coincident Data

Winter (12/1/96-2/28/97)



Insufficient Coincident Data

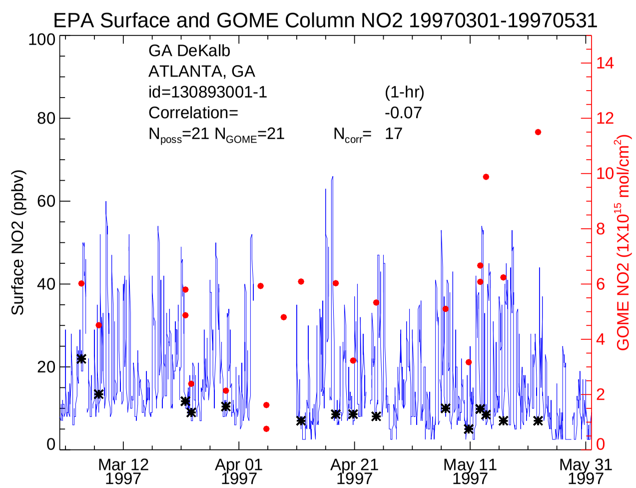
Summer (6/1/97-8/31/97)

Insufficient Coincident Data

Fall (9/1/96-11/30/96)

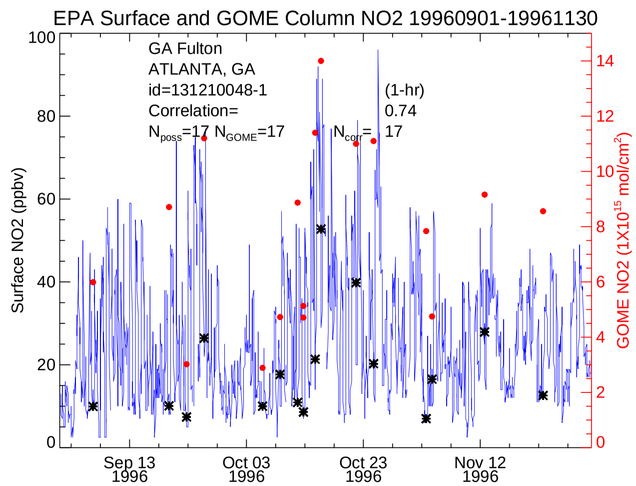
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



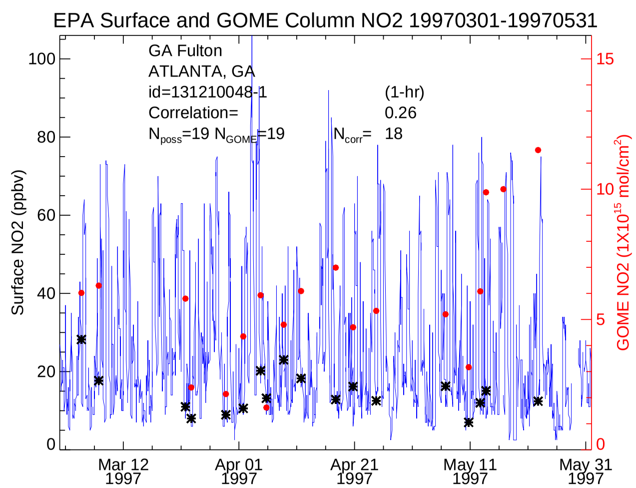
Insufficient Coincident Data

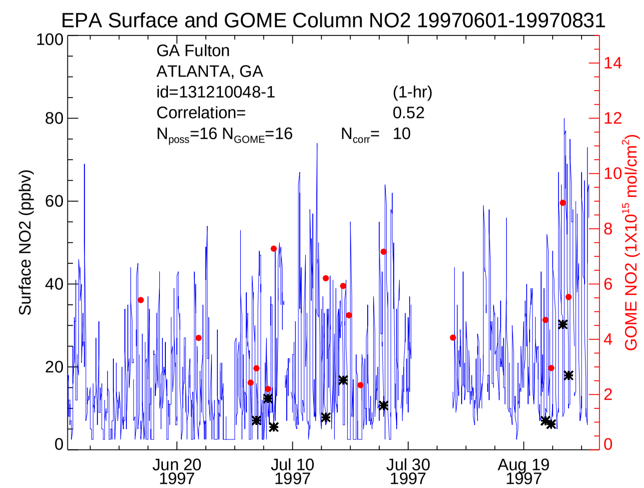
Summer (6/1/97-8/31/97)



Insufficient Coincident Data

Winter (12/1/96-2/28/97)



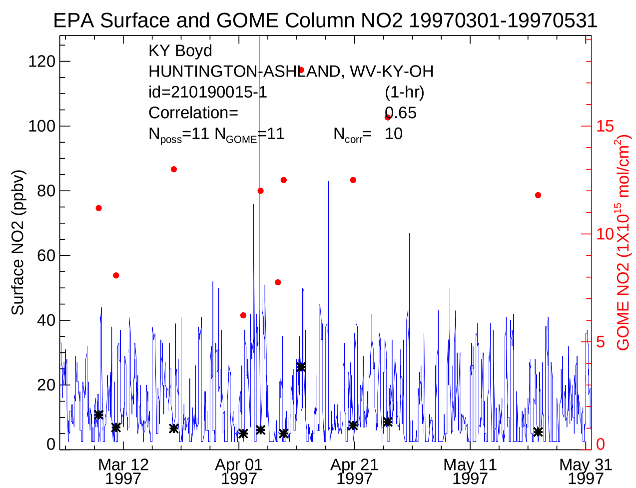


Insufficient Coincident Data

Fall (9/1/96-11/30/96)

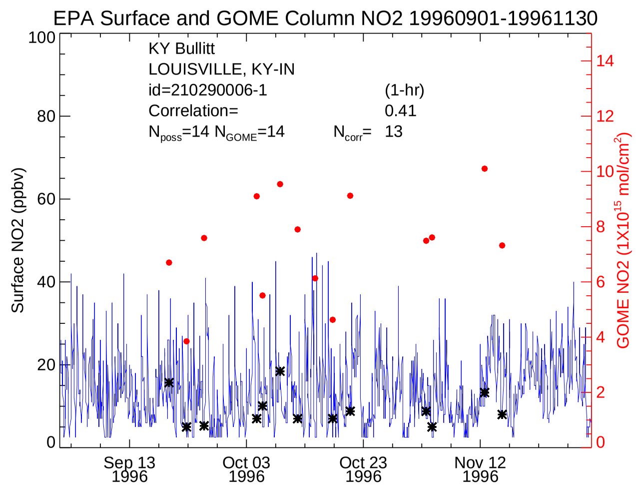
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



Insufficient Coincident Data

Summer (6/1/97-8/31/97)



Insufficient Coincident Data

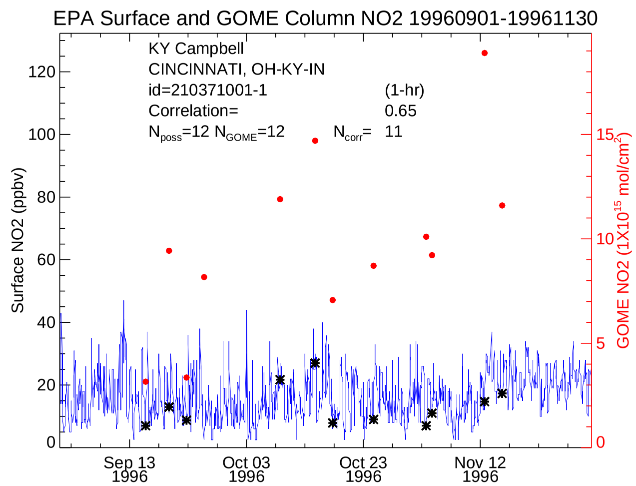
Winter (12/1/96-2/28/97)

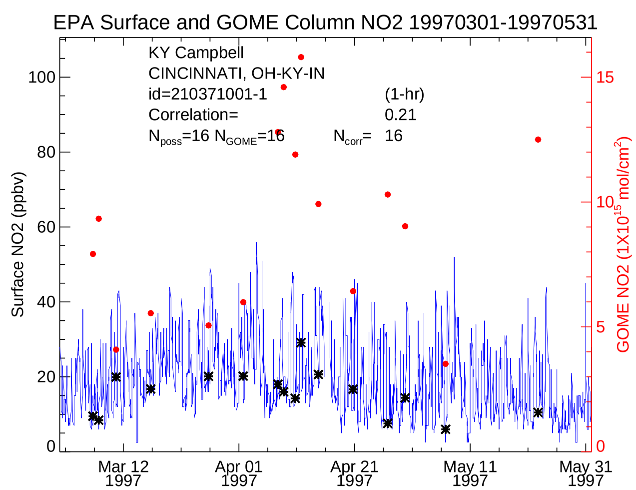
Insufficient Coincident Data

Spring (3/1/97-5/31/97)

Insufficient Coincident Data

Summer (6/1/97-8/31/97)





Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

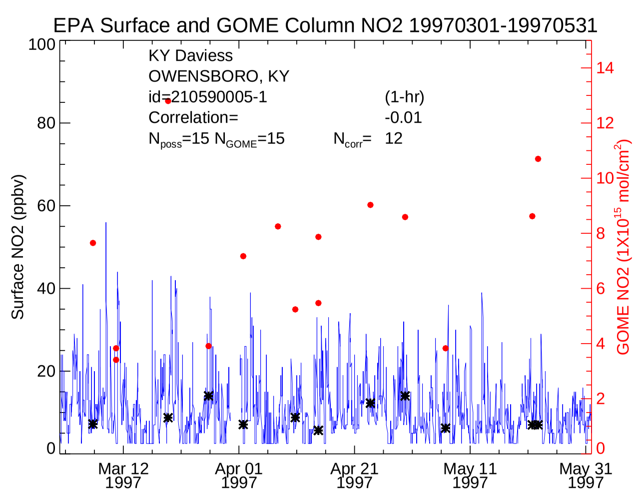
Summer (6/1/97-8/31/97)

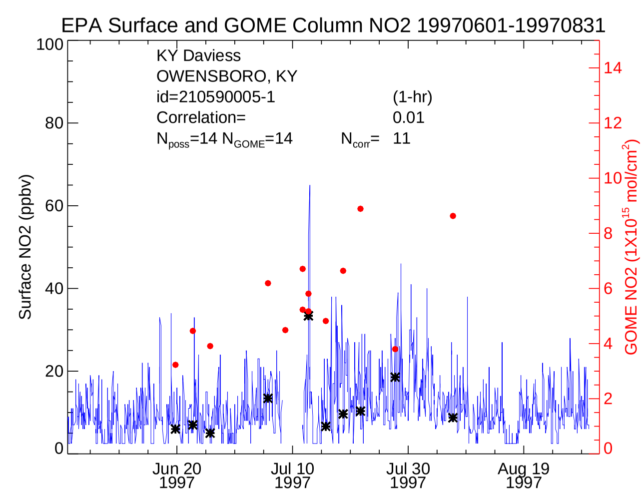
Insufficient Coincident Data

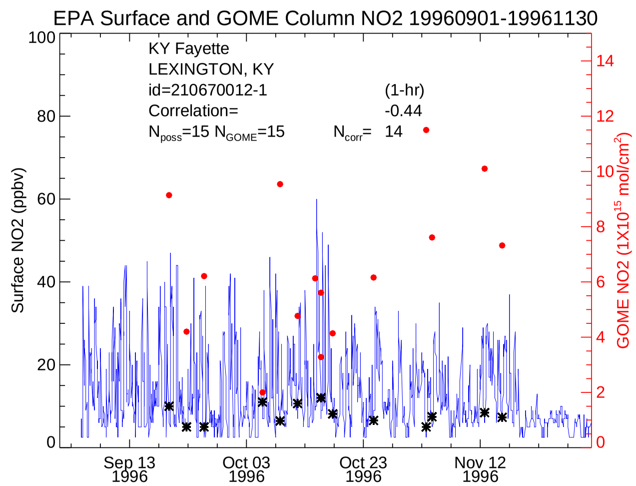
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

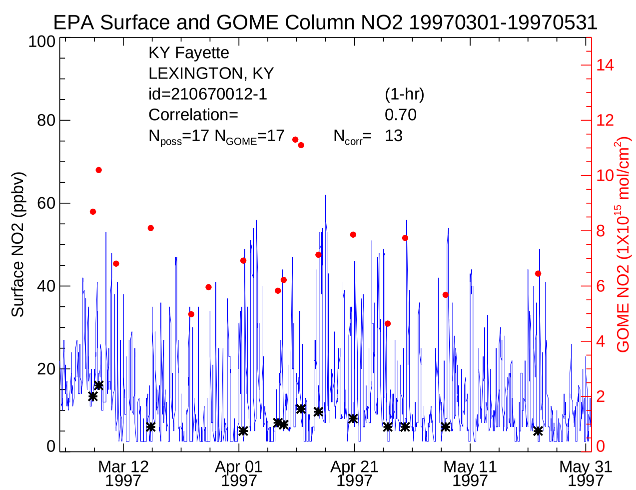






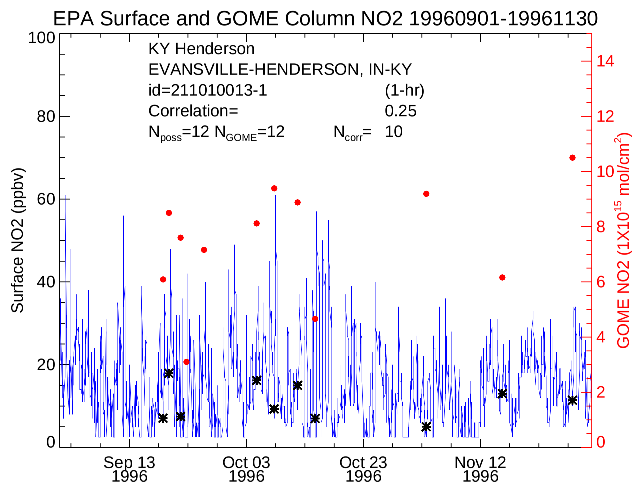
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



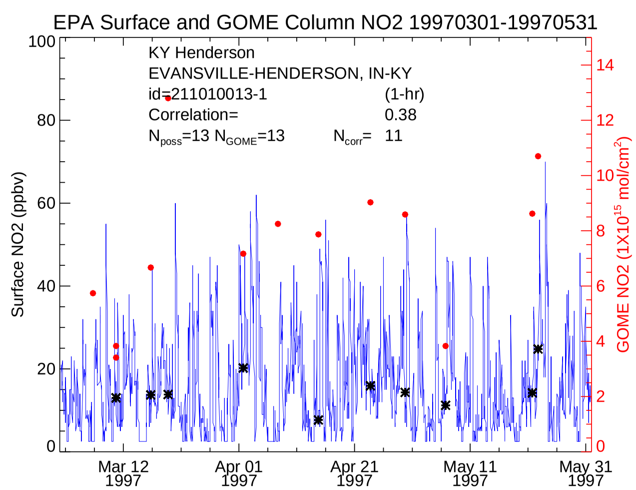
Insufficient Coincident Data

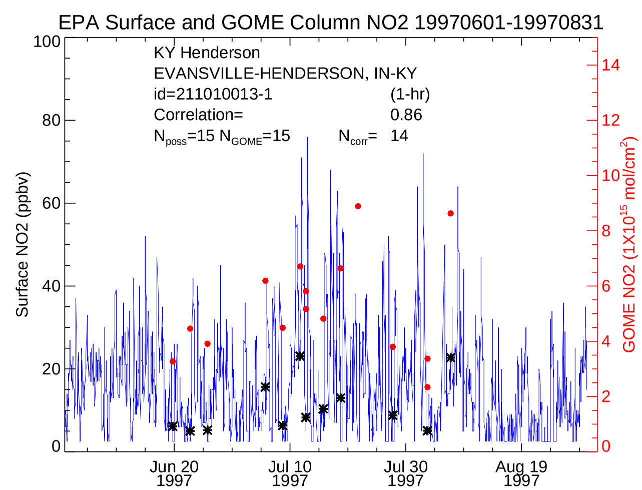
Summer (6/1/97-8/31/97)



Insufficient Coincident Data

Winter (12/1/96-2/28/97)



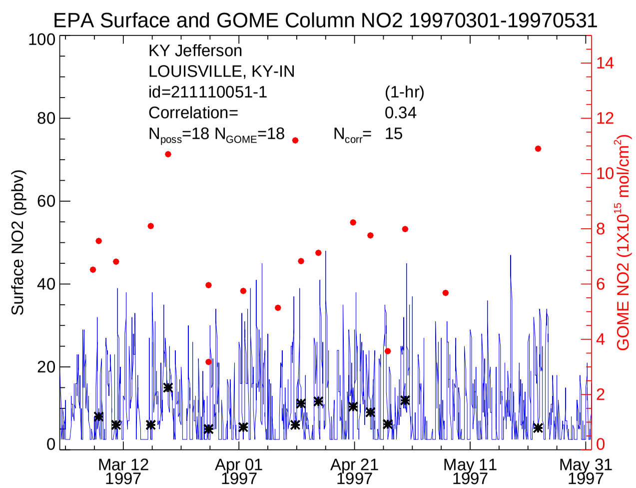


Insufficient Coincident Data

Fall (9/1/96-11/30/96)

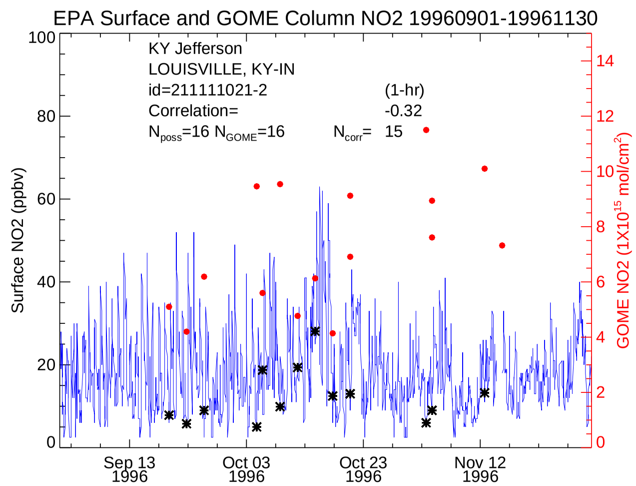
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



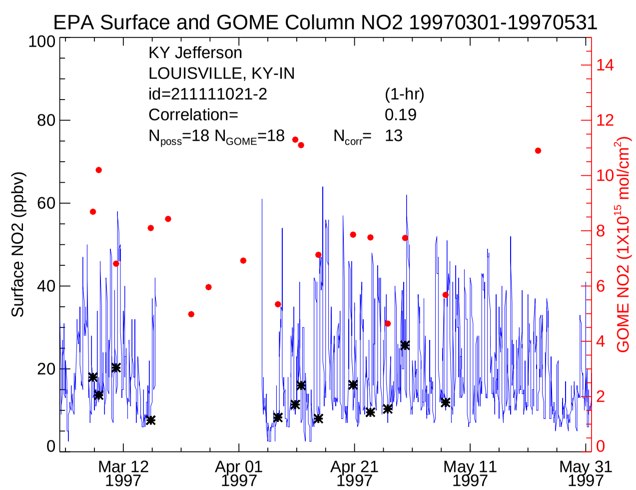
Insufficient Coincident Data

Summer (6/1/97-8/31/97)



Insufficient Coincident Data

Winter (12/1/96-2/28/97)



Insufficient Coincident Data

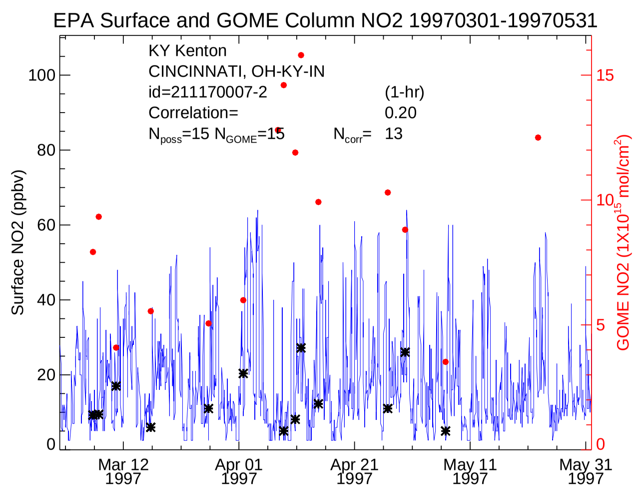
Summer (6/1/97-8/31/97)

Insufficient Coincident Data

Fall (9/1/96-11/30/96)

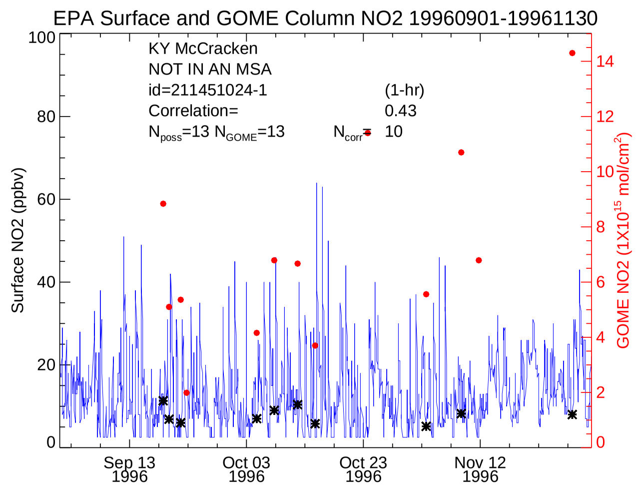
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



Insufficient Coincident Data

Summer (6/1/97-8/31/97)



Insufficient Coincident Data

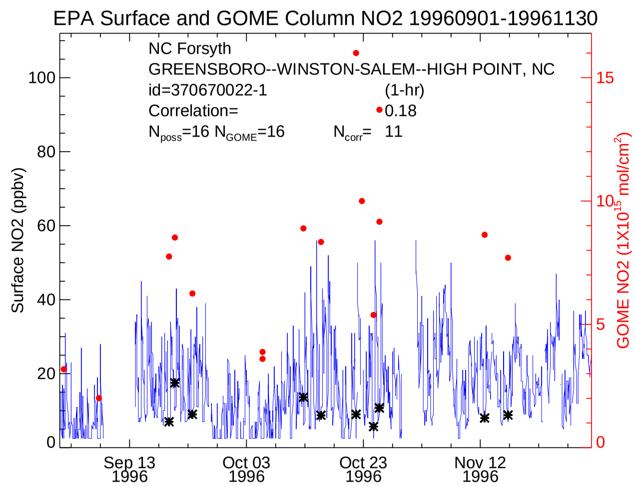
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

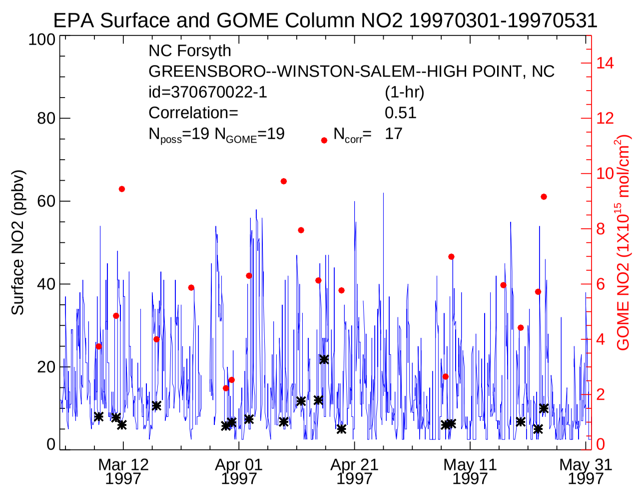
Insufficient Coincident Data

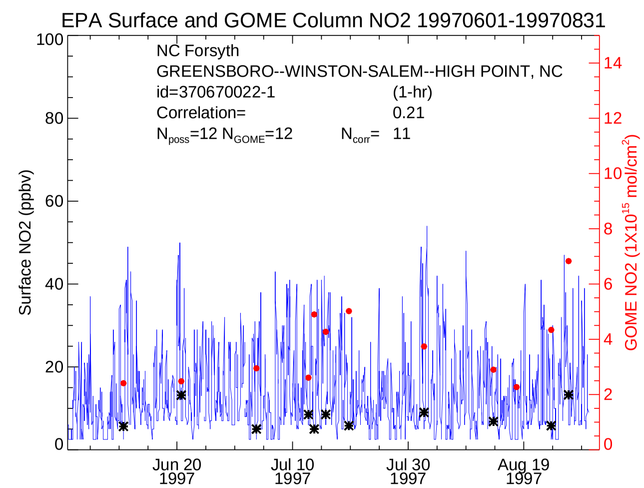
Summer (6/1/97-8/31/97)

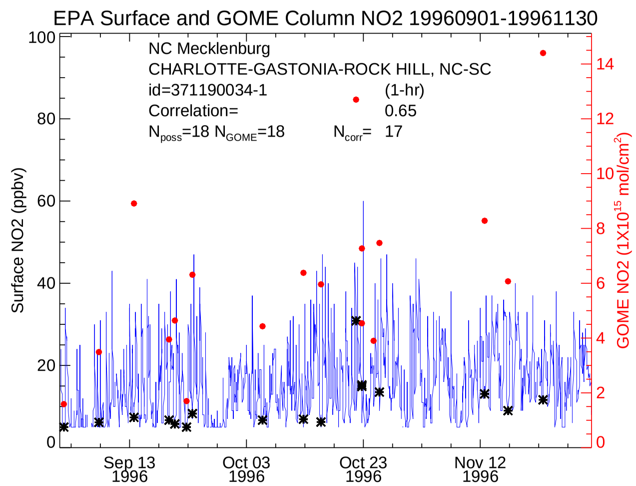


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

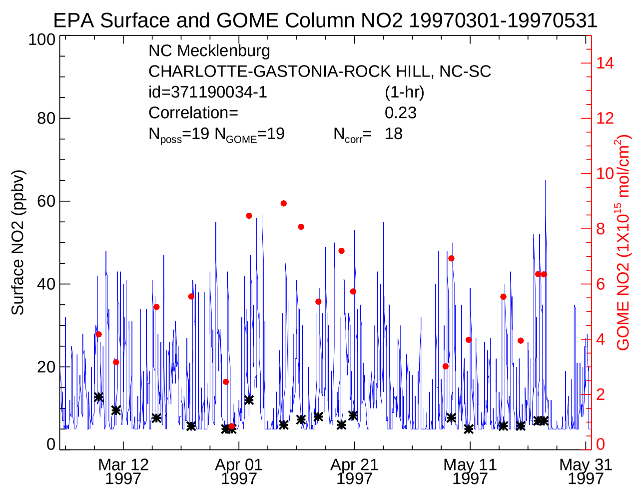


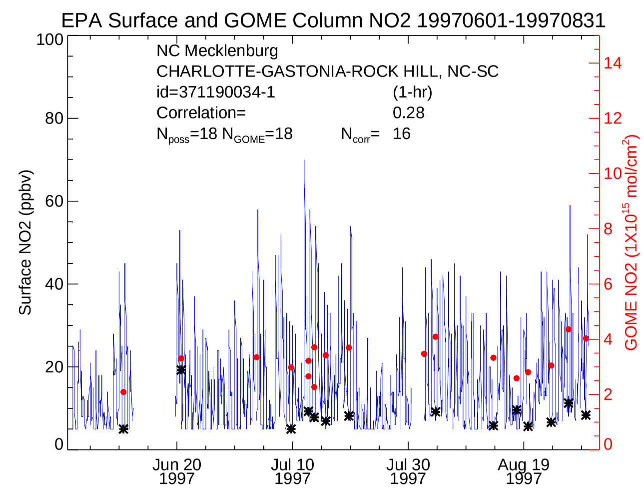


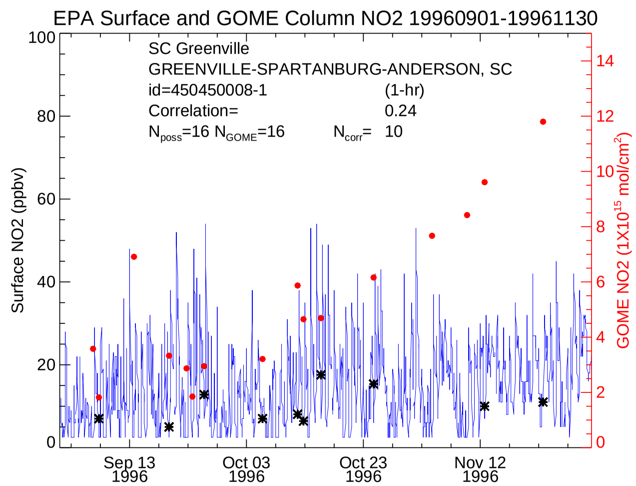


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

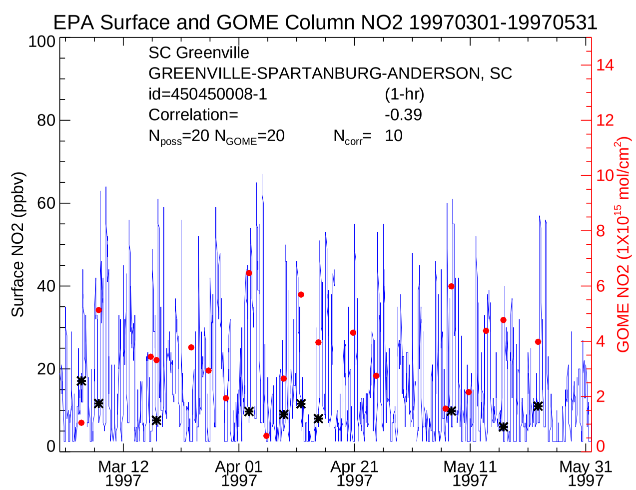






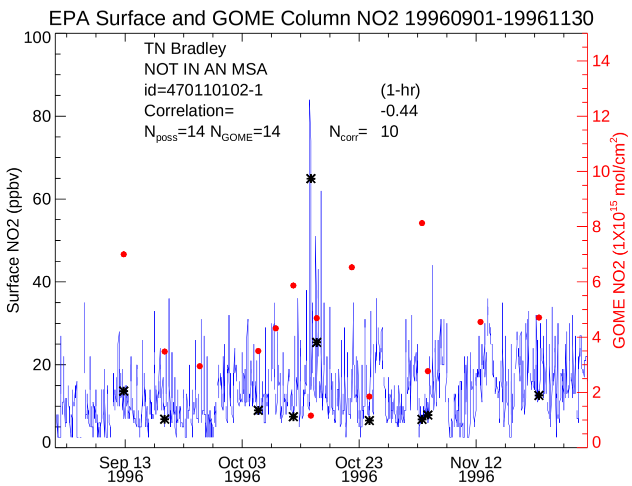
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



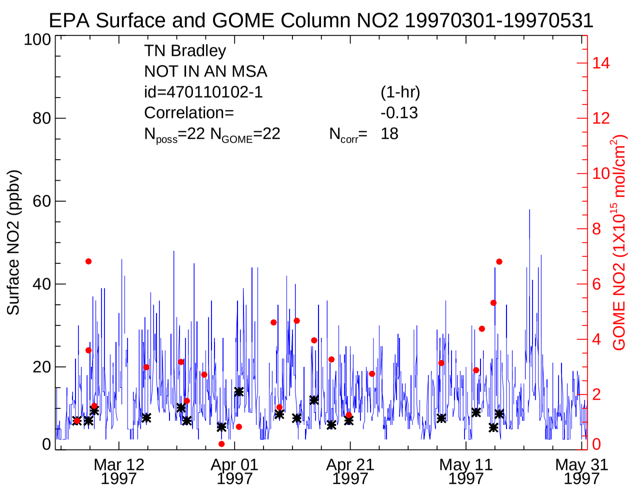
Insufficient Coincident Data

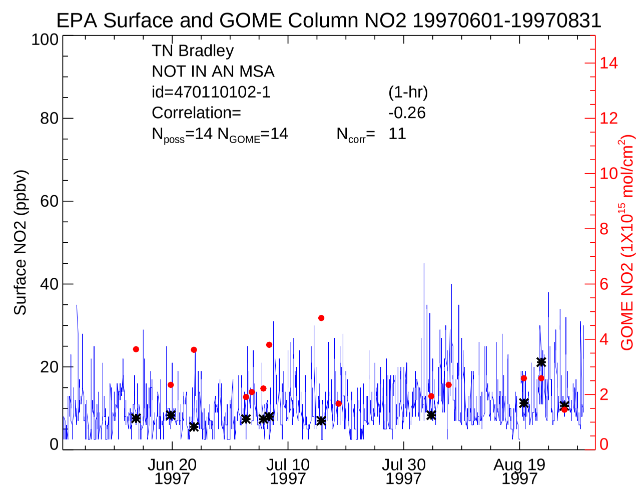
Summer (6/1/97-8/31/97)

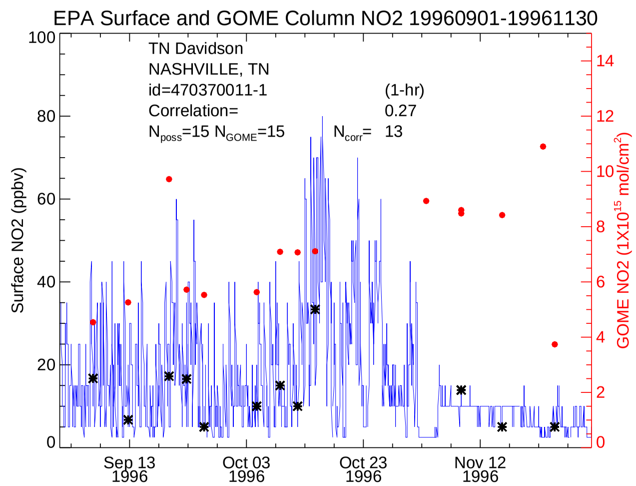


Insufficient Coincident Data

Winter (12/1/96-2/28/97)







Insufficient Coincident Data

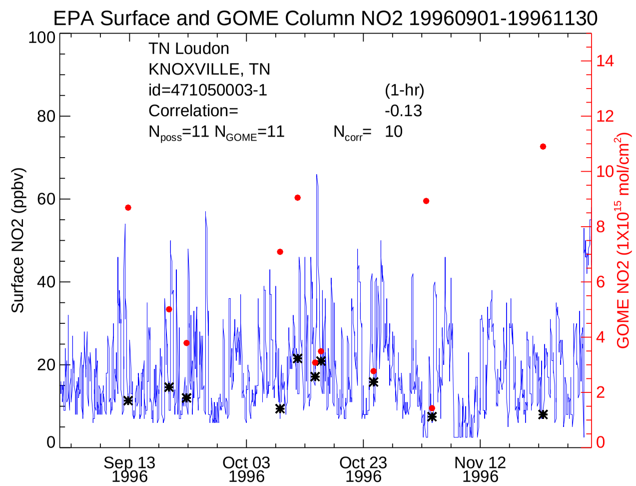
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

Insufficient Coincident Data

Summer (6/1/97-8/31/97)



Insufficient Coincident Data

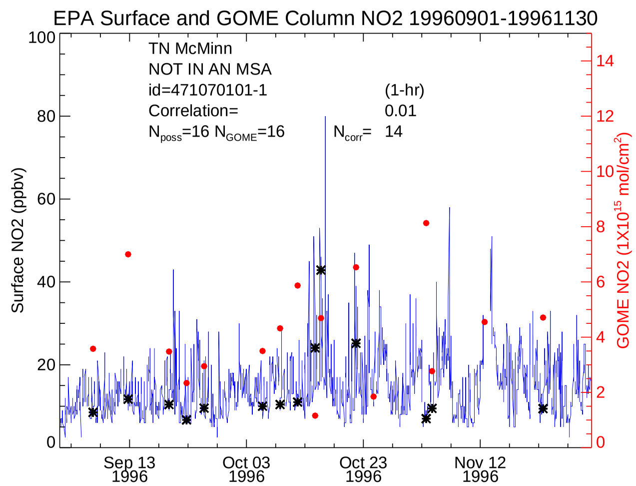
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

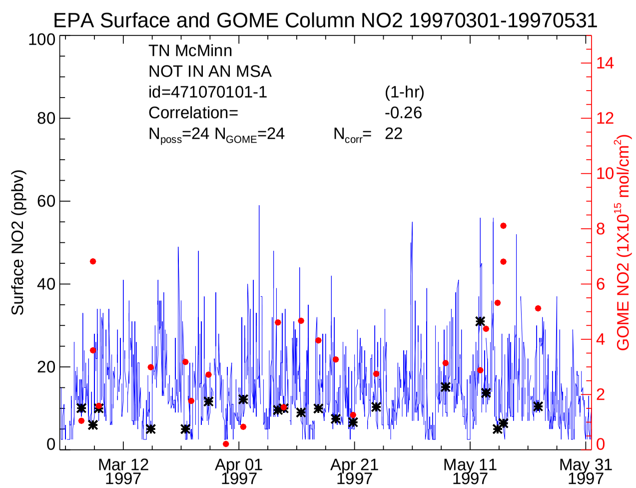
Insufficient Coincident Data

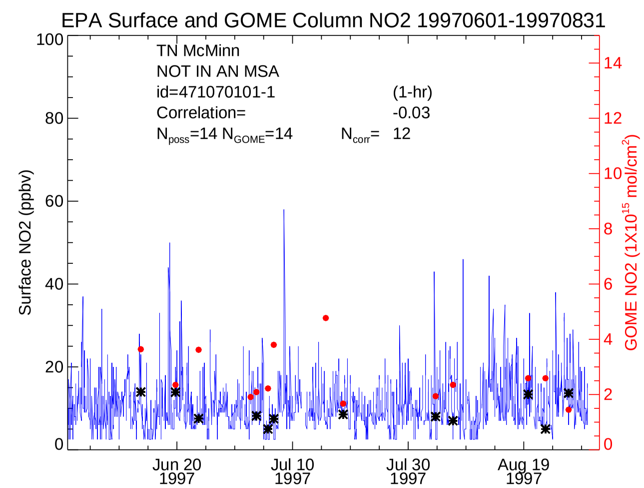
Summer (6/1/97-8/31/97)

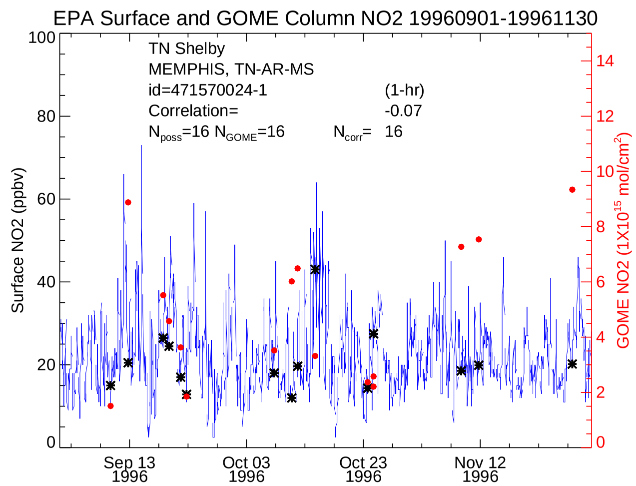


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

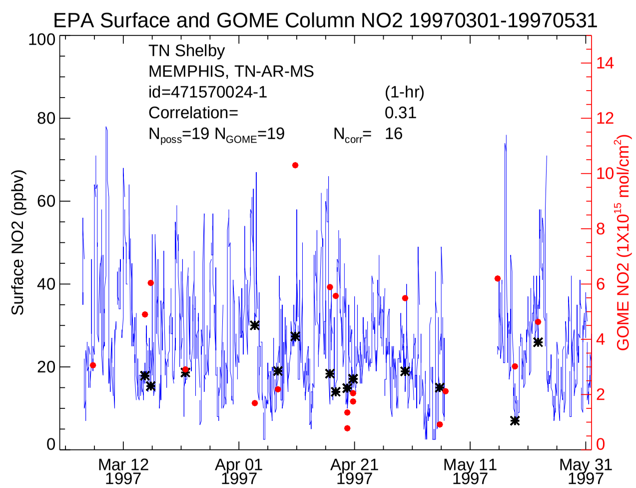


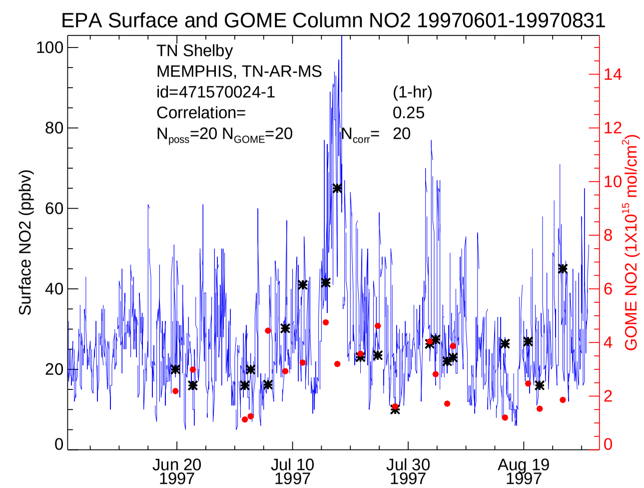




Insufficient Coincident Data

Winter (12/1/96-2/28/97)



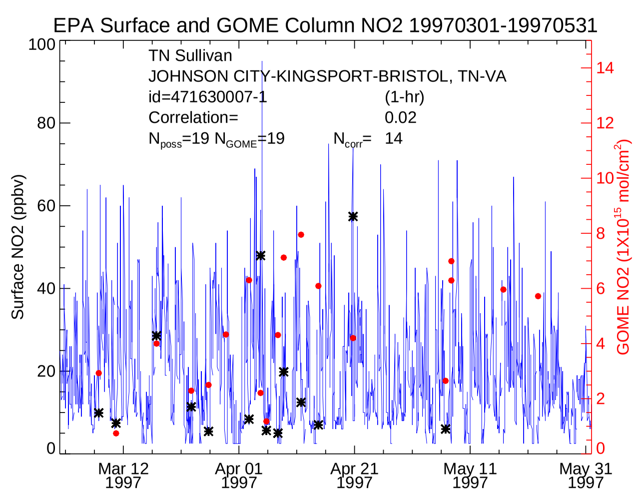


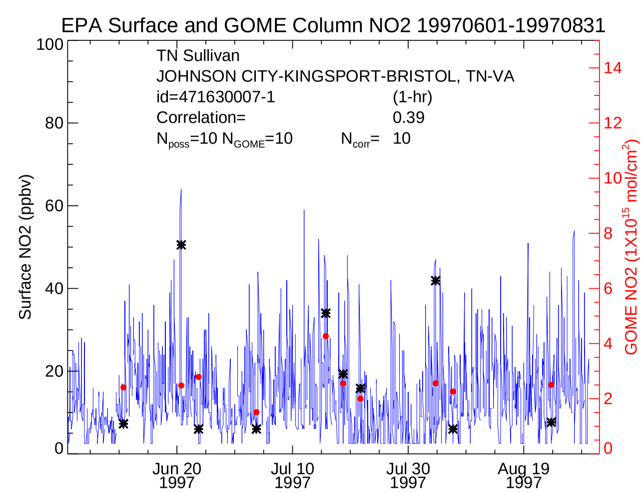
Insufficient Coincident Data

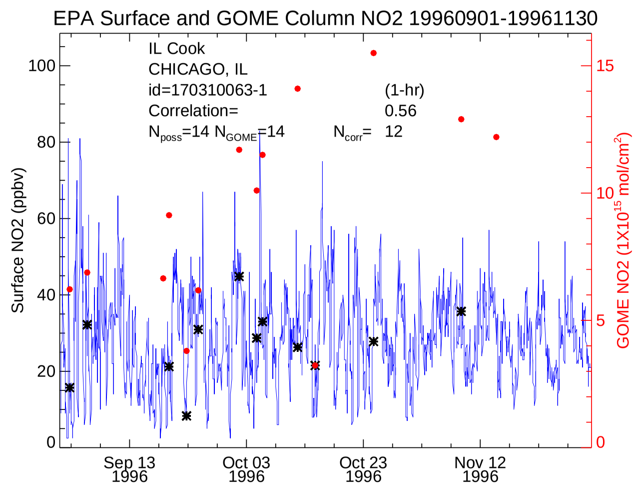
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

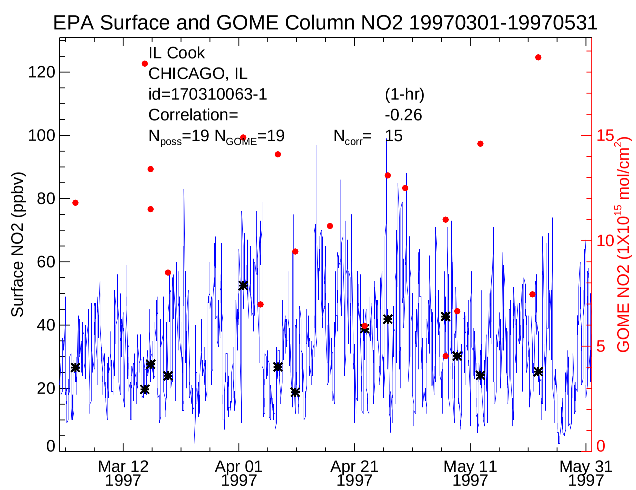


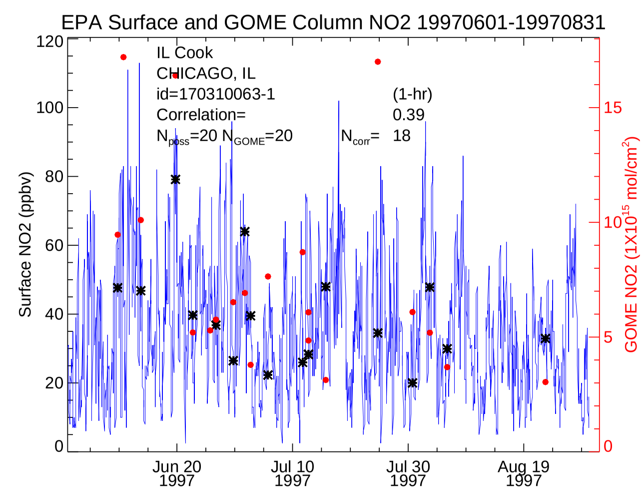


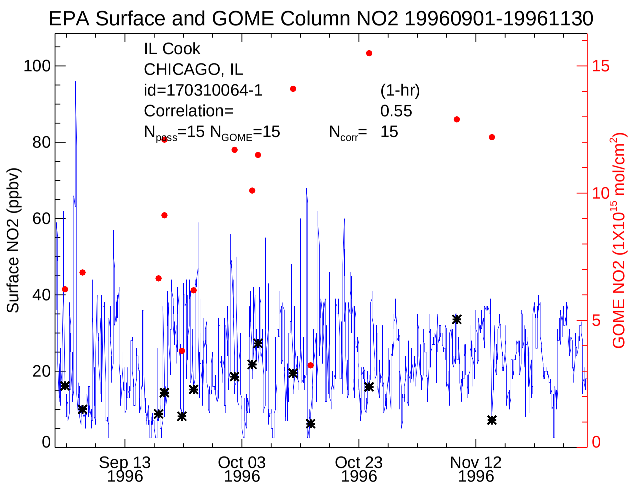


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

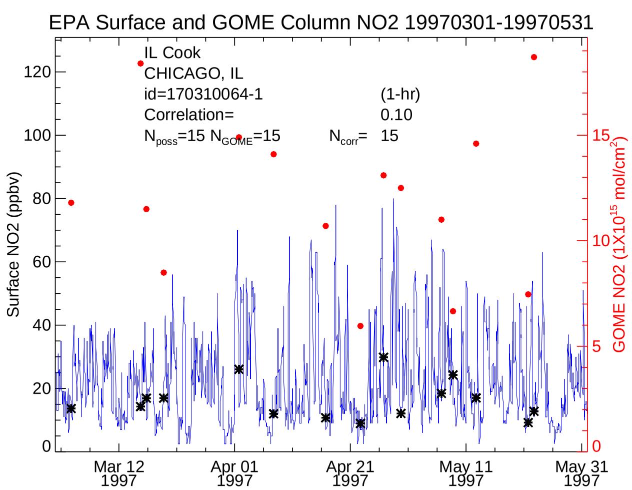


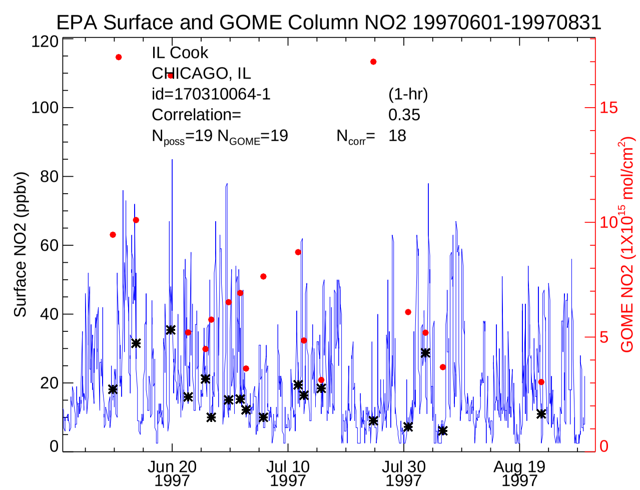




Insufficient Coincident Data

Winter (12/1/96-2/28/97)





Insufficient Coincident Data

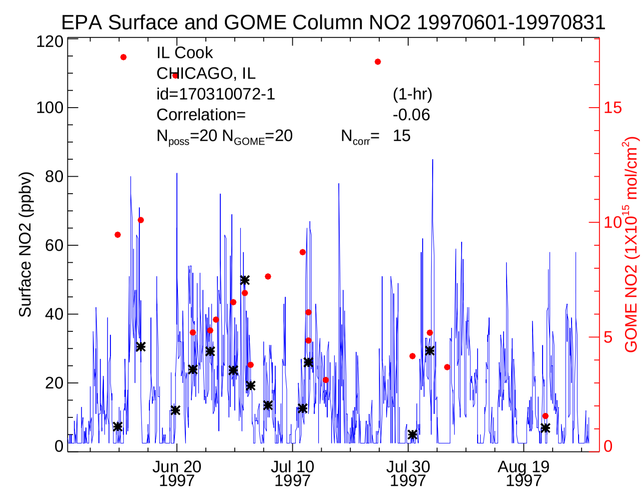
Fall (9/1/96-11/30/96)

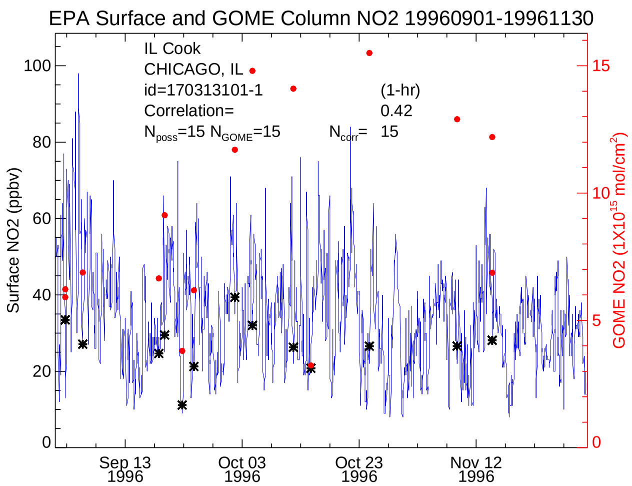
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

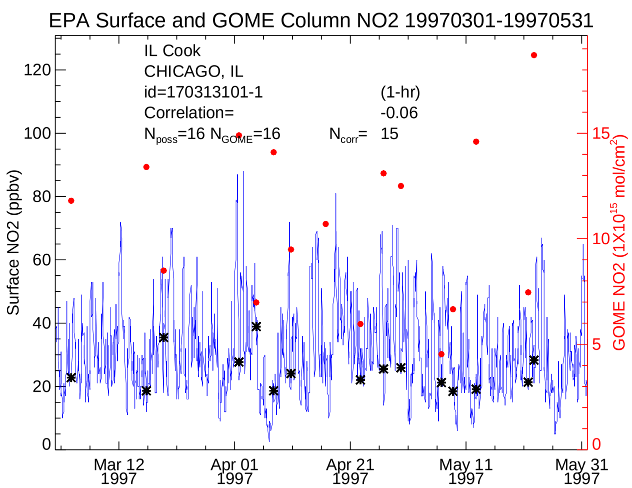
Spring (3/1/97-5/31/97)

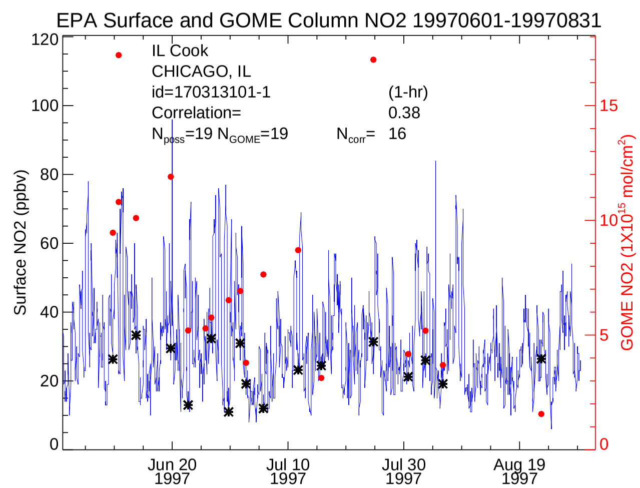


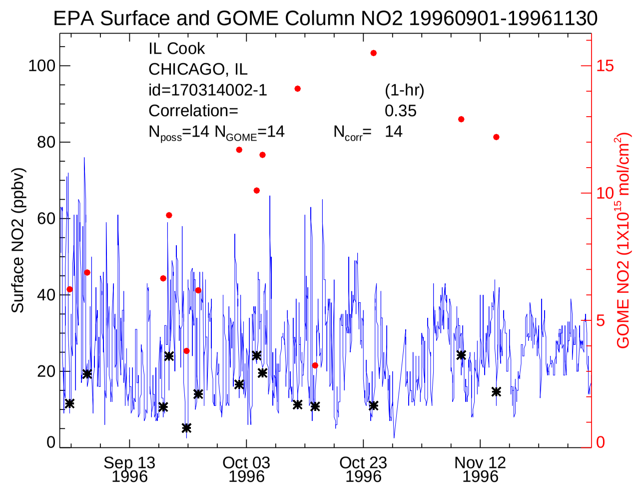


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

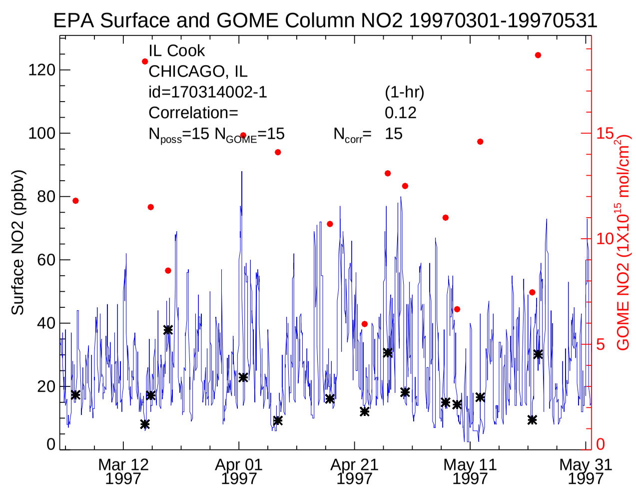


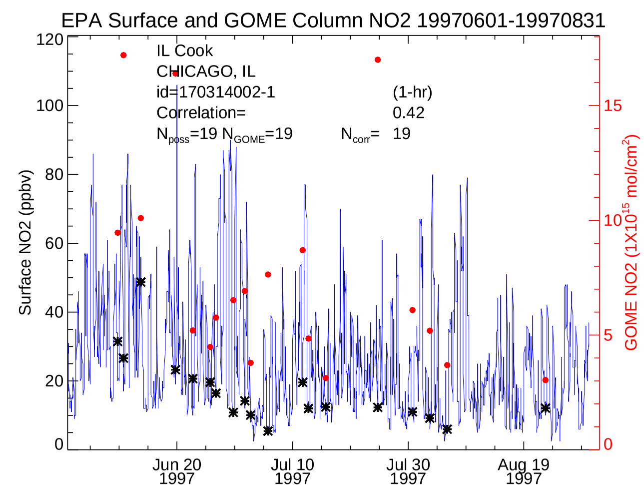




Insufficient Coincident Data

Winter (12/1/96-2/28/97)





Insufficient Coincident Data

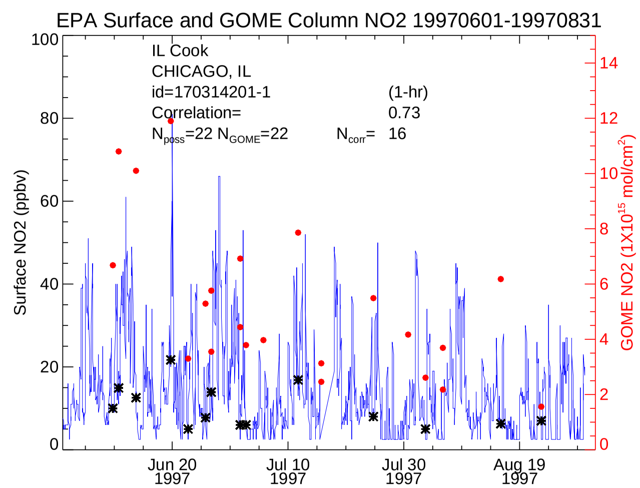
Fall (9/1/96-11/30/96)

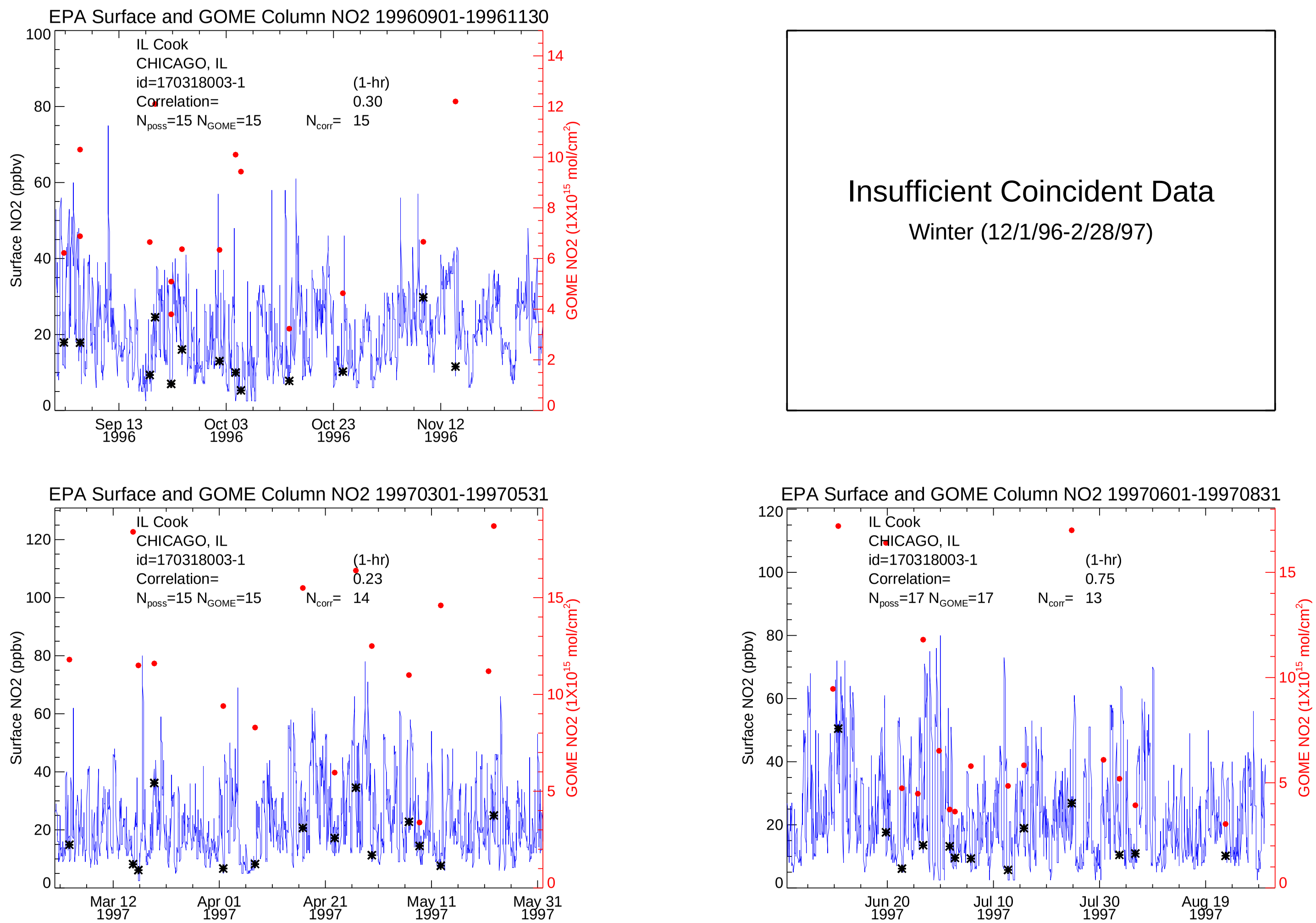
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)




EPA Surface and GOME Column NO2 19960901-19961130
IL Cook
CHICAGO, IL
id=170318003-1
Correlation=
N_{poss}=15 N_{GOME}=15
(1-hr)
0.30
N_{corr}= 15
Surface NO2 (ppbv)
GOME NO2 ($1X10^{15}$ mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
Insufficient Coincident Data
Winter (12/1/96-2/28/97)
EPA Surface and GOME Column NO2 19970301-19970531
IL Cook
CHICAGO, IL
id=170318003-1
Correlation=
N_{poss}=15 N_{GOME}=15
(1-hr)
0.23
N_{corr}= 14
Surface NO2 (ppbv)
GOME NO2 ($1X10^{15}$ mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
EPA Surface and GOME Column NO2 19970601-19970831
IL Cook
CHICAGO, IL
id=170318003-1
Correlation=
N_{poss}=17 N_{GOME}=17
(1-hr)
0.75
N_{corr}= 13
Surface NO2 (ppbv)
GOME NO2 ($1X10^{15}$ mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

Insufficient Coincident Data

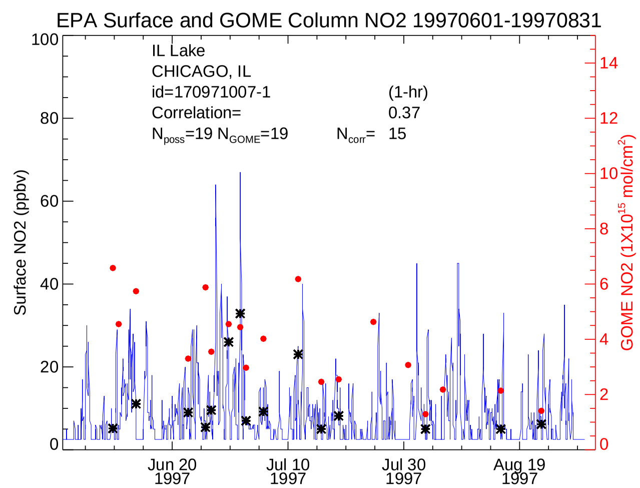
Fall (9/1/96-11/30/96)

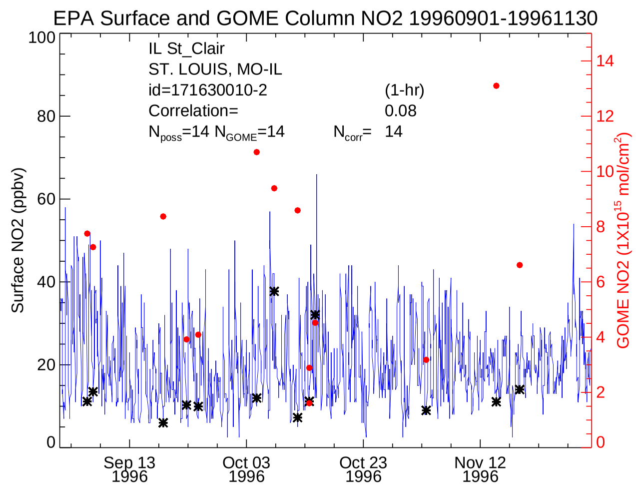
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

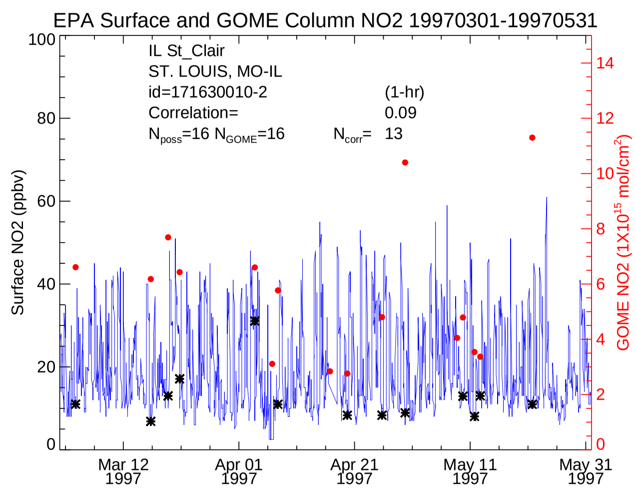
Spring (3/1/97-5/31/97)

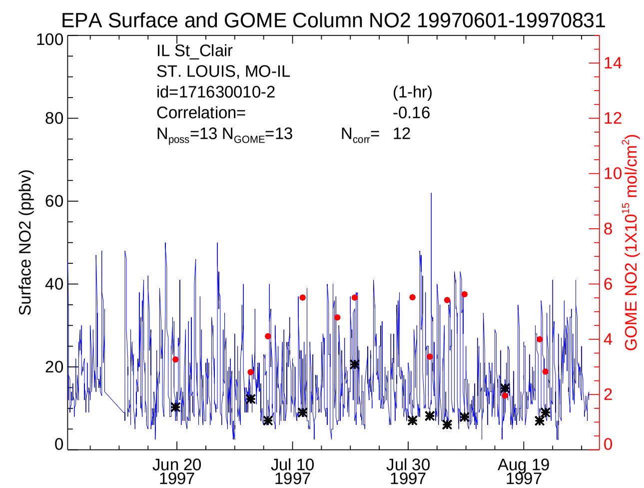




Insufficient Coincident Data

Winter (12/1/96-2/28/97)





Insufficient Coincident Data

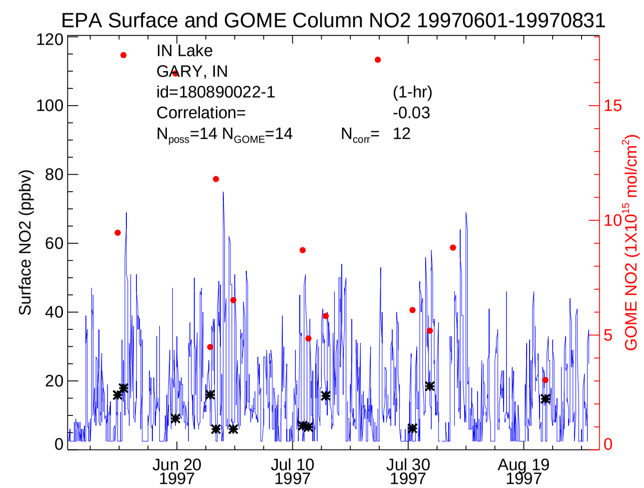
Fall (9/1/96-11/30/96)

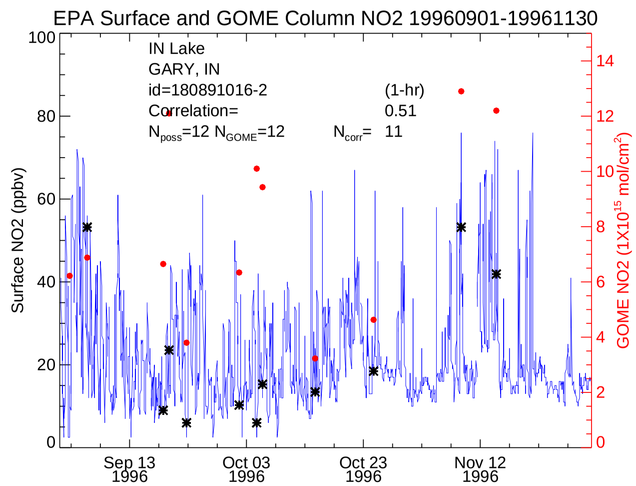
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

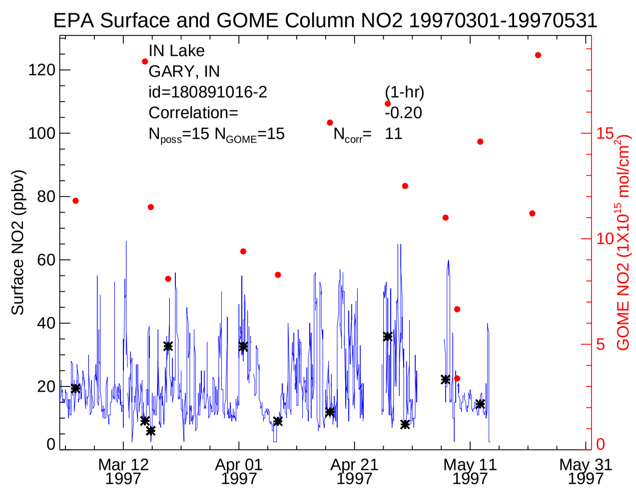
Spring (3/1/97-5/31/97)





Insufficient Coincident Data

Winter (12/1/96-2/28/97)



Insufficient Coincident Data

Summer (6/1/97-8/31/97)

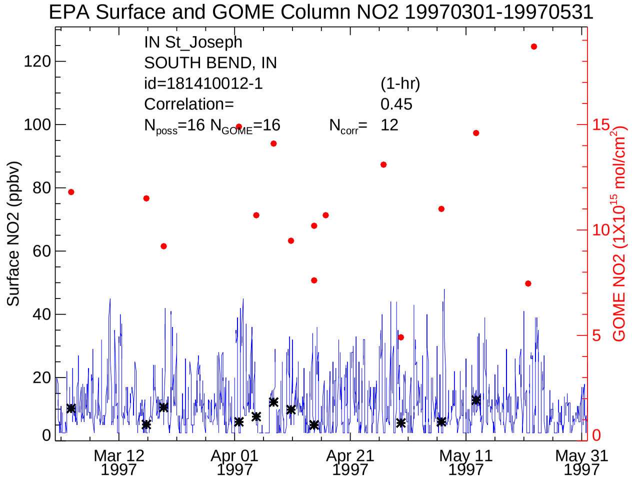
Insufficient Coincident Data

Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

EPA Surface and GOME Column NO2 19970301-19970531



Insufficient Coincident Data

Summer (6/1/97-8/31/97)

Insufficient Coincident Data

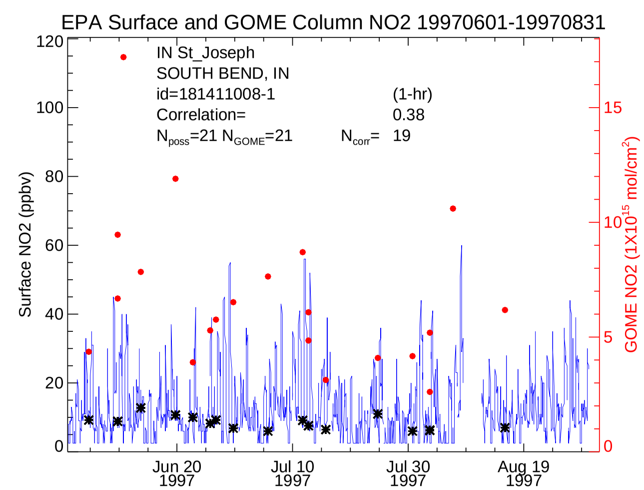
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



Insufficient Coincident Data

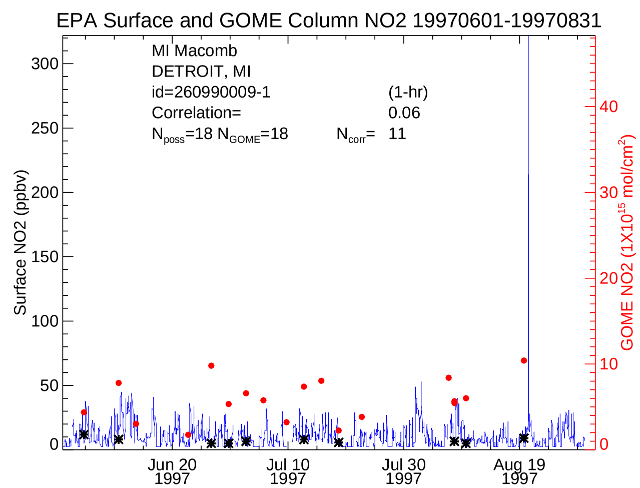
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

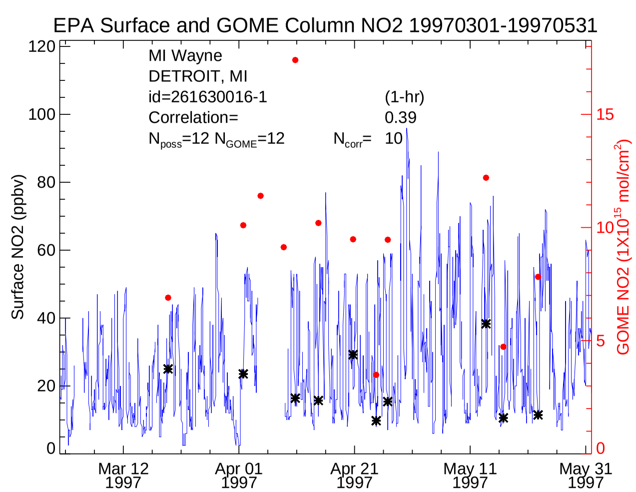


Insufficient Coincident Data

Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)



Insufficient Coincident Data

Summer (6/1/97-8/31/97)

Insufficient Coincident Data

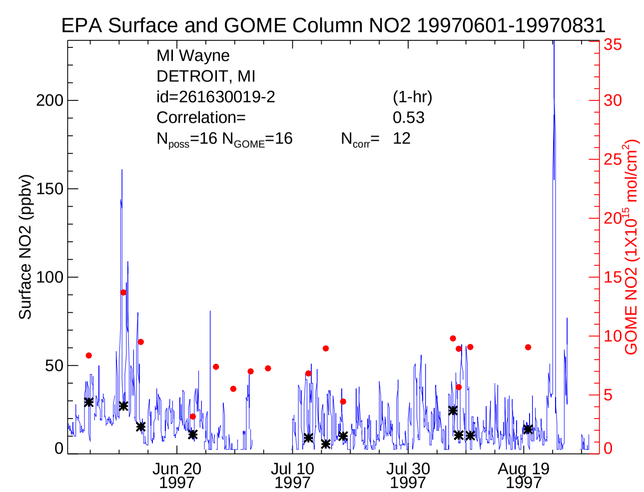
Fall (9/1/96-11/30/96)

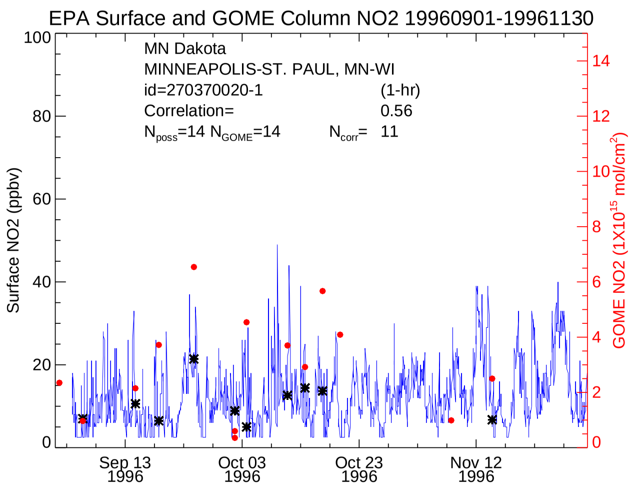
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

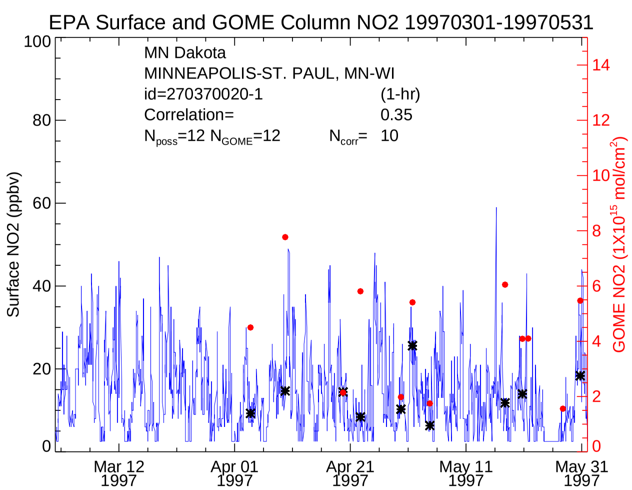
Spring (3/1/97-5/31/97)

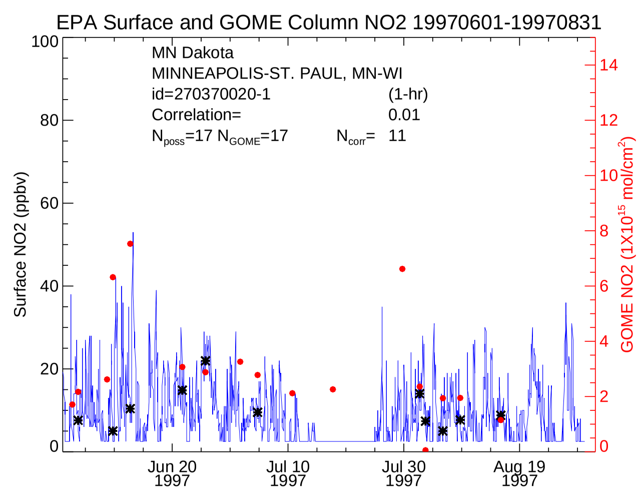




Insufficient Coincident Data

Winter (12/1/96-2/28/97)





Insufficient Coincident Data

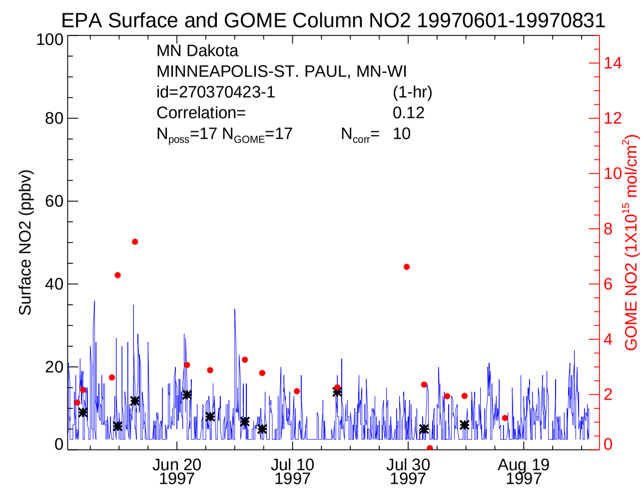
Fall (9/1/96-11/30/96)

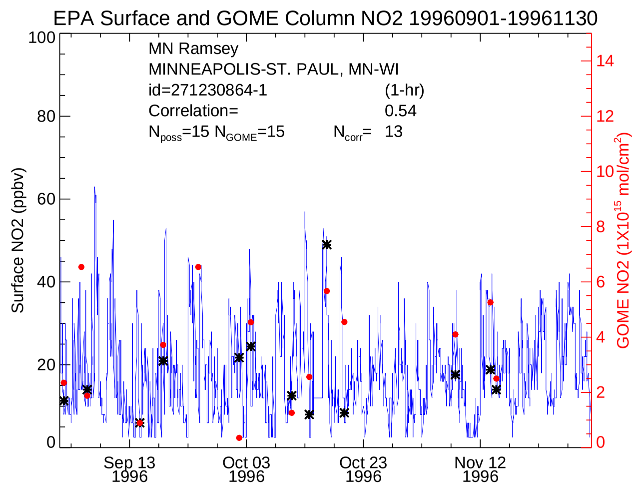
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

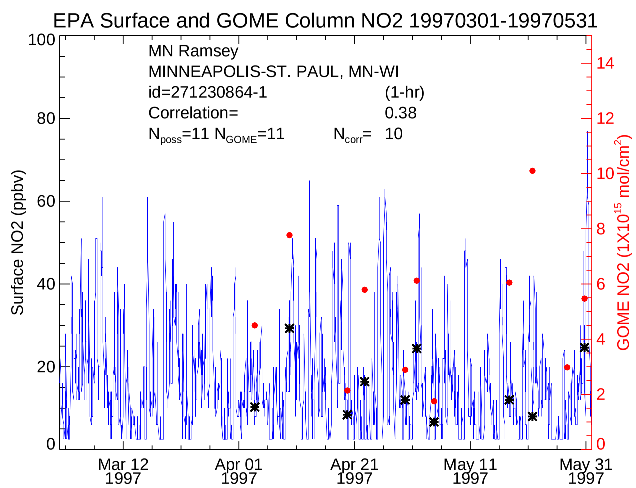
Spring (3/1/97-5/31/97)

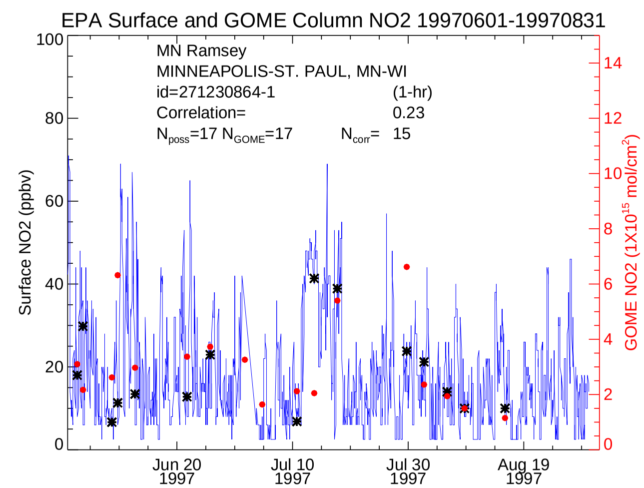




Insufficient Coincident Data

Winter (12/1/96-2/28/97)



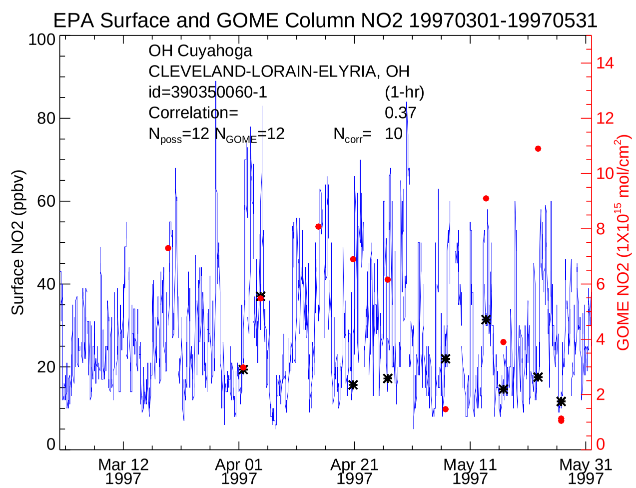


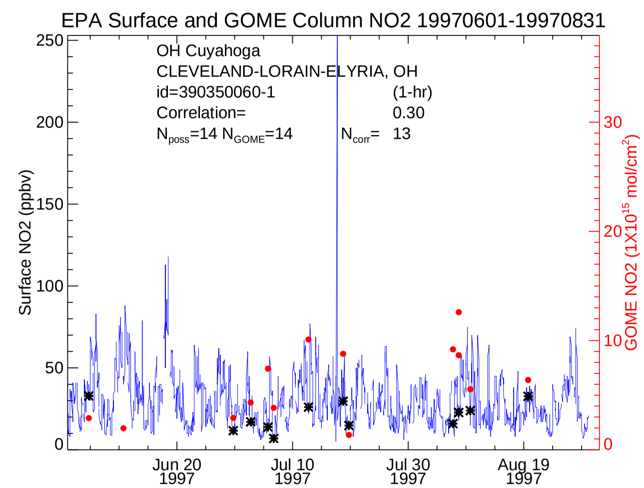
Insufficient Coincident Data

Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)





Insufficient Coincident Data

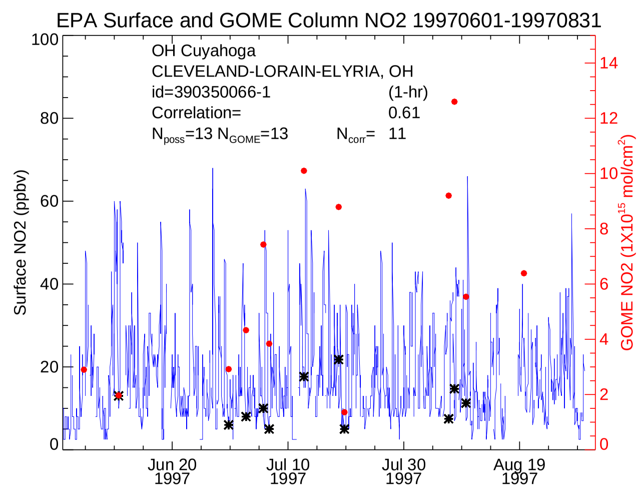
Fall (9/1/96-11/30/96)

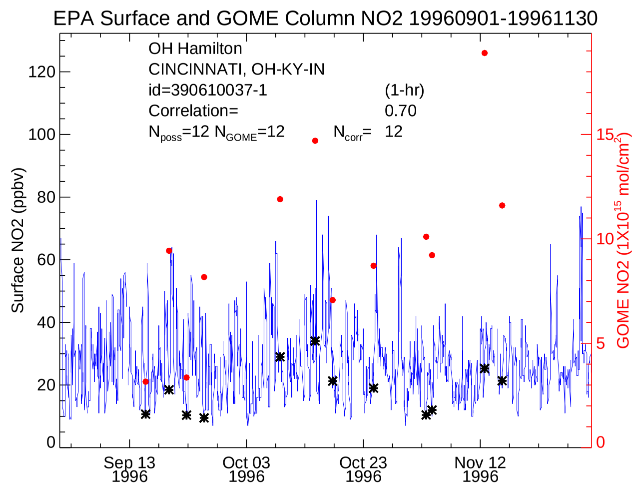
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

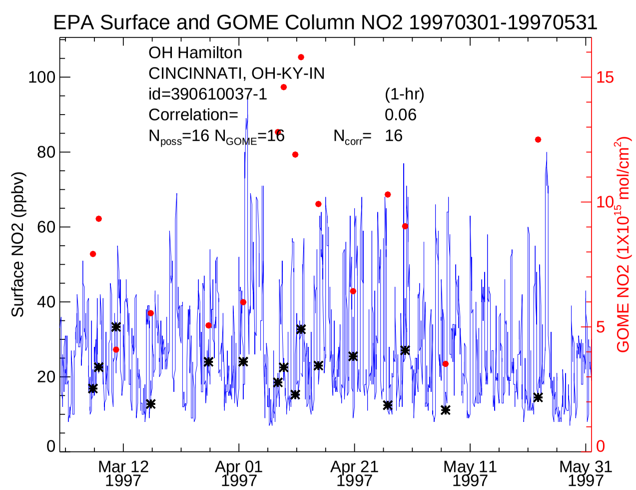
Spring (3/1/97-5/31/97)





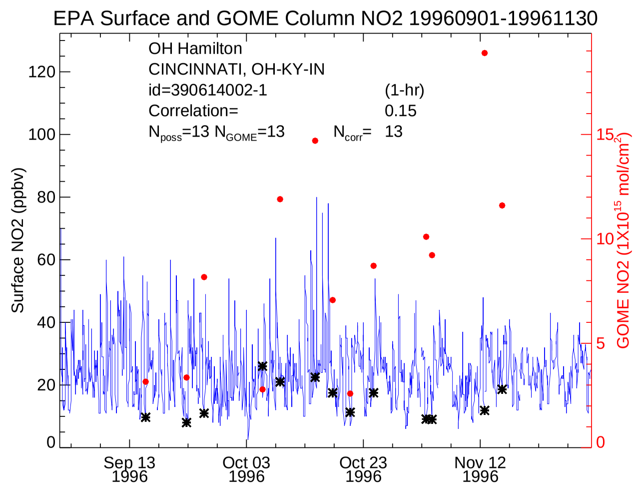
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



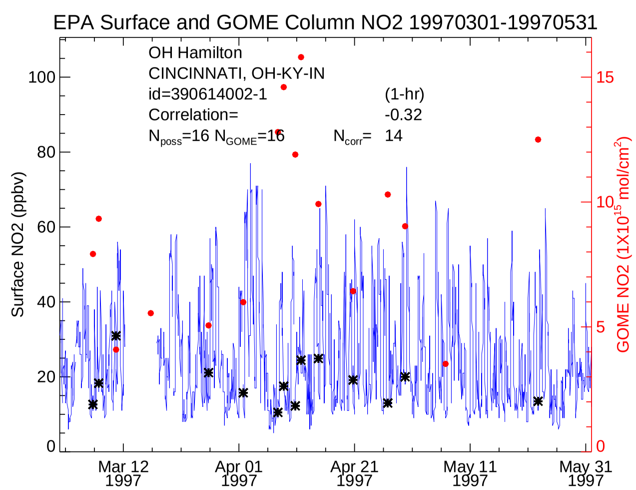
Insufficient Coincident Data

Summer (6/1/97-8/31/97)



Insufficient Coincident Data

Winter (12/1/96-2/28/97)



Insufficient Coincident Data

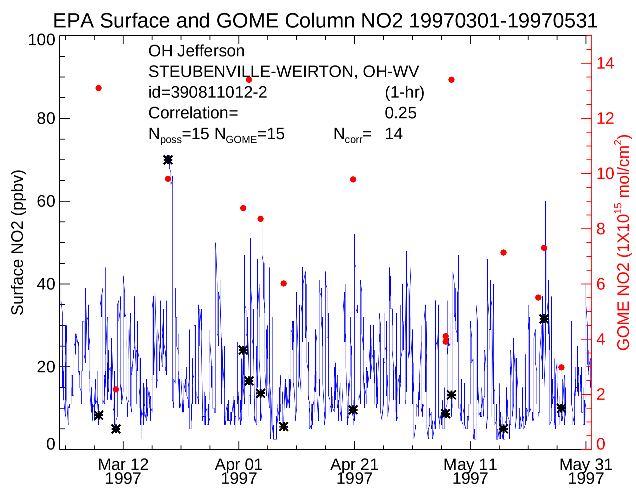
Summer (6/1/97-8/31/97)

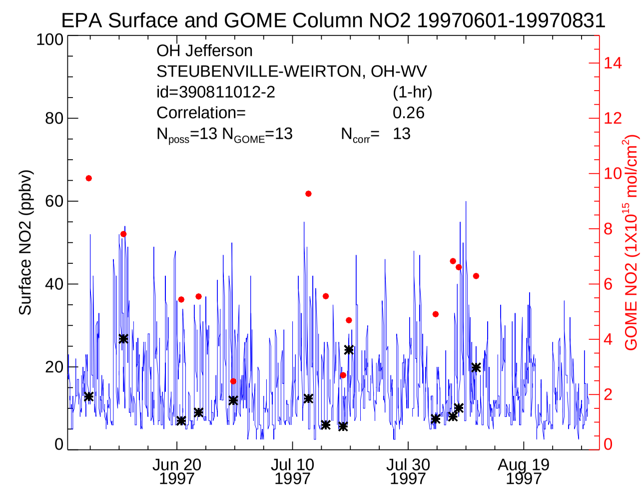
Insufficient Coincident Data

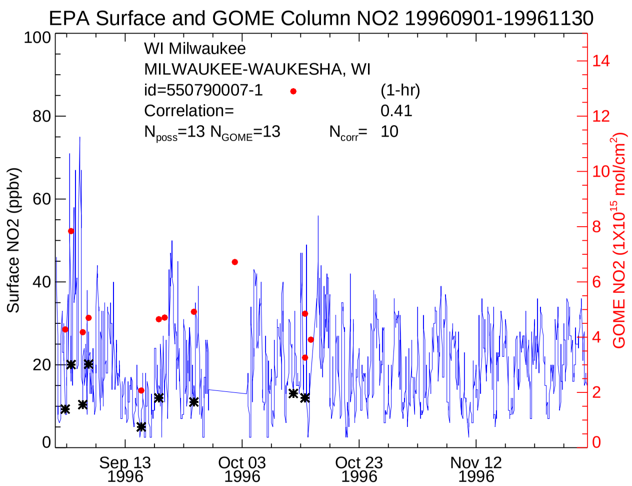
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

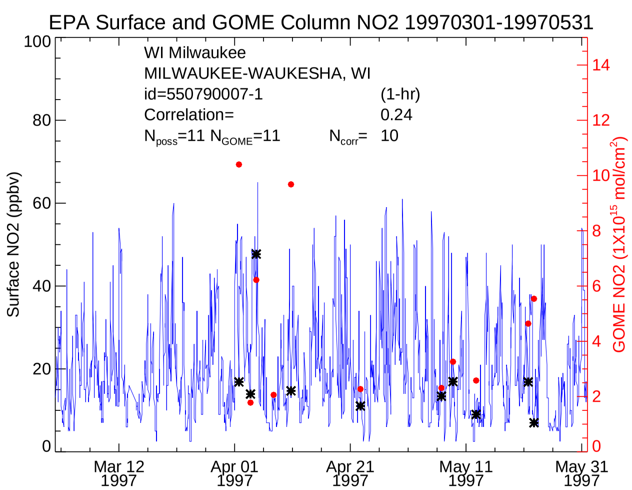


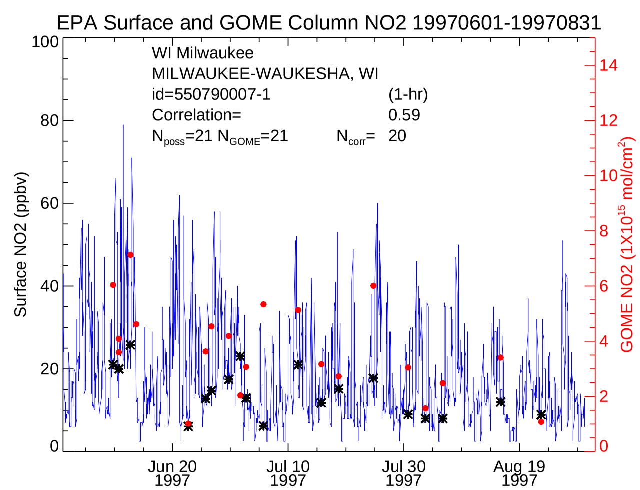


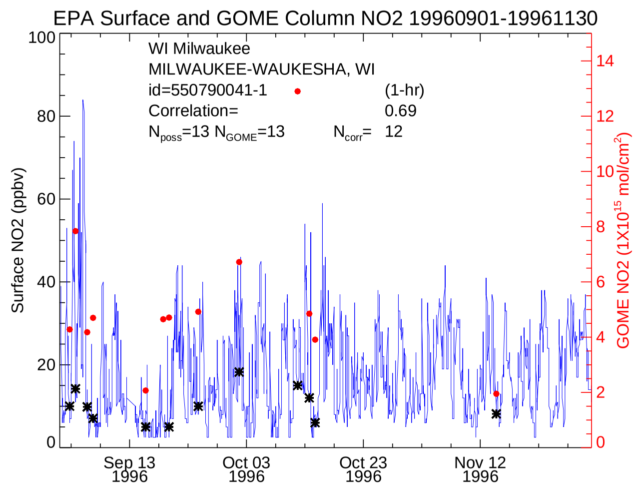


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

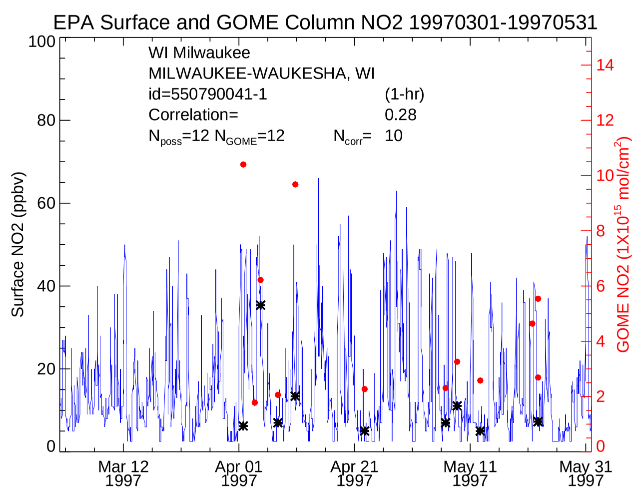


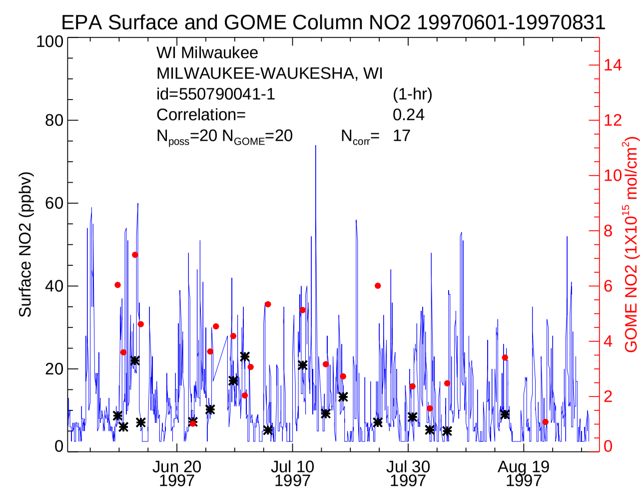


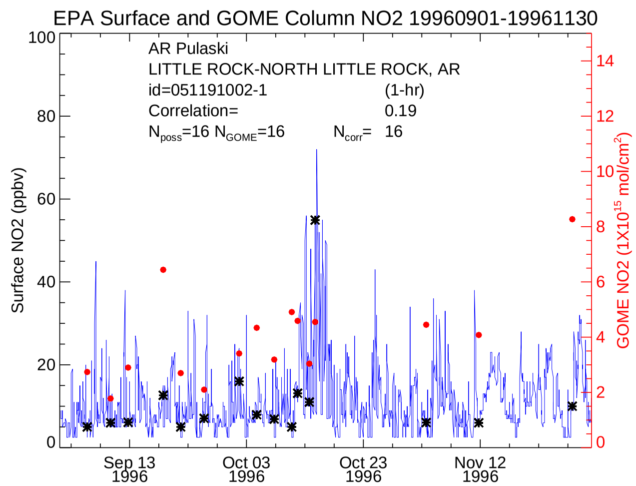


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

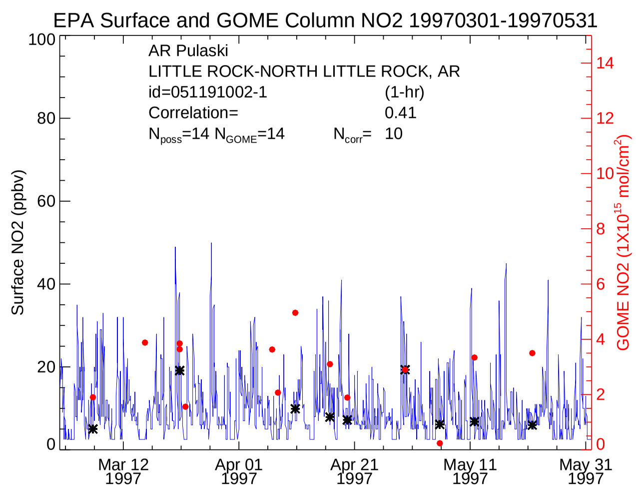


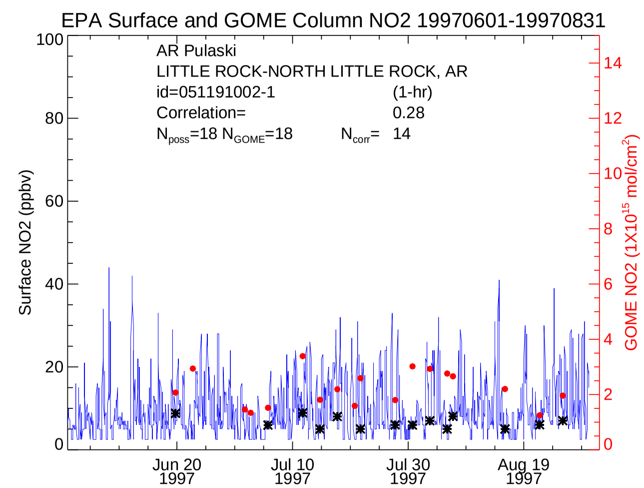


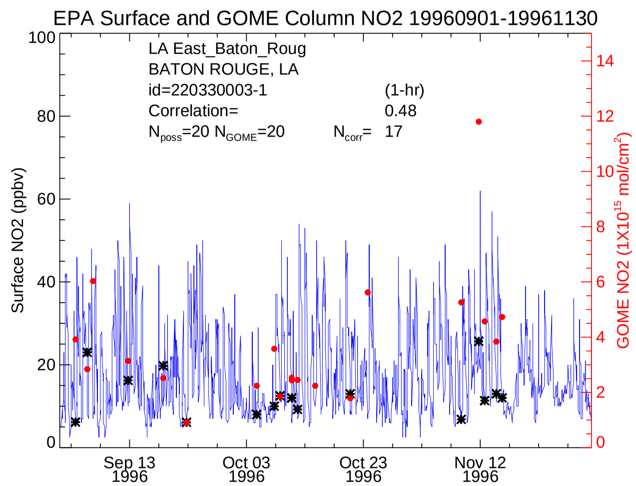


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

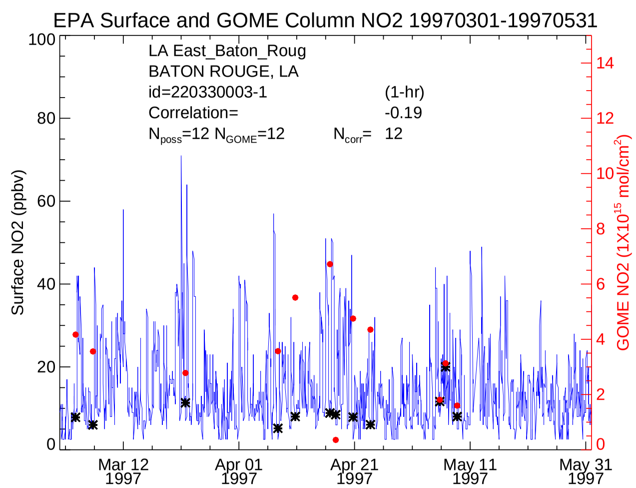


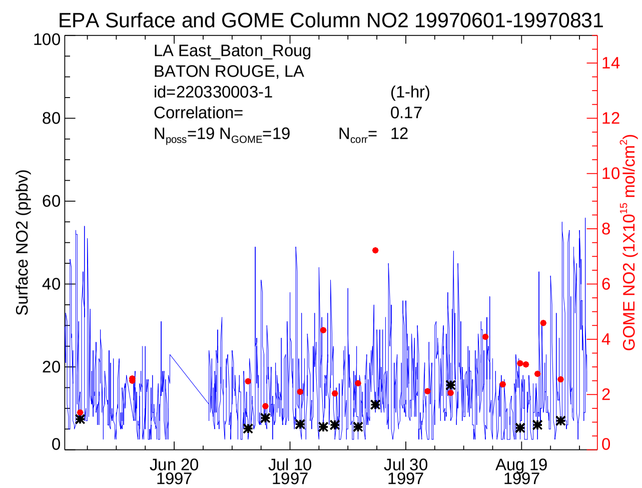


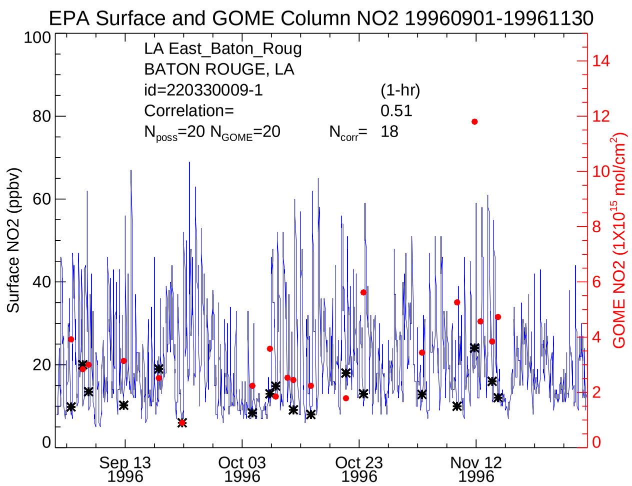


Insufficient Coincident Data

Winter (12/1/96-2/28/97)





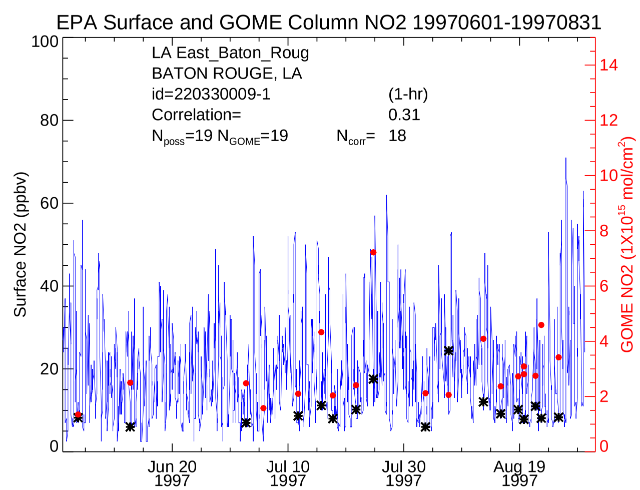


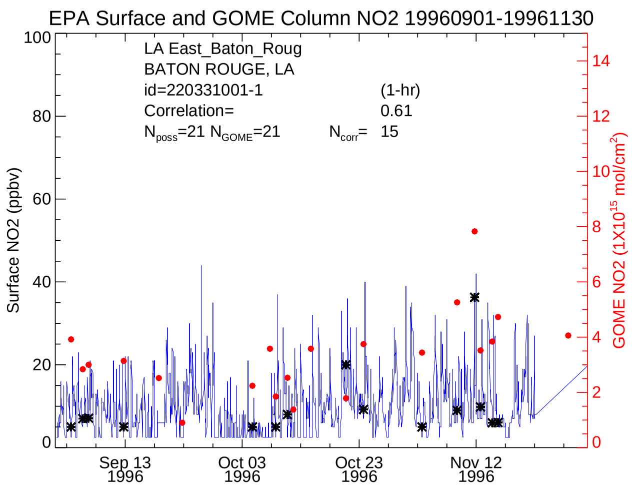
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)





Insufficient Coincident Data

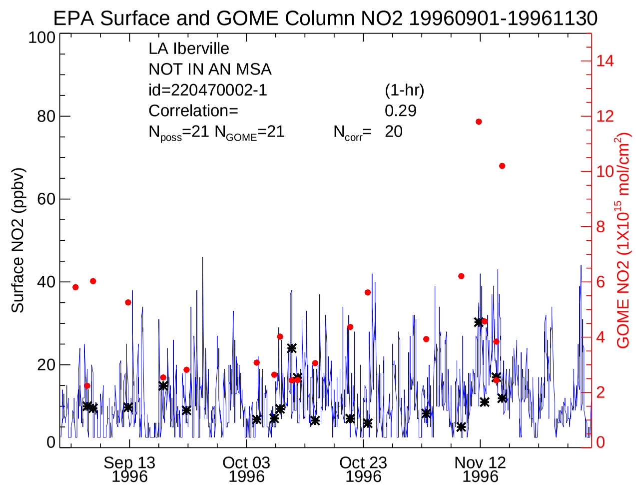
Winter (12/1/96-2/28/97)

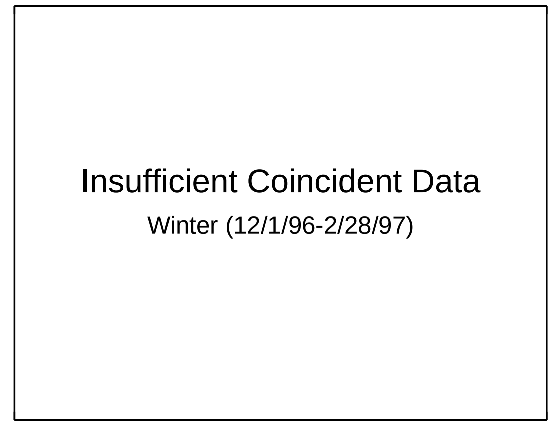
Insufficient Coincident Data

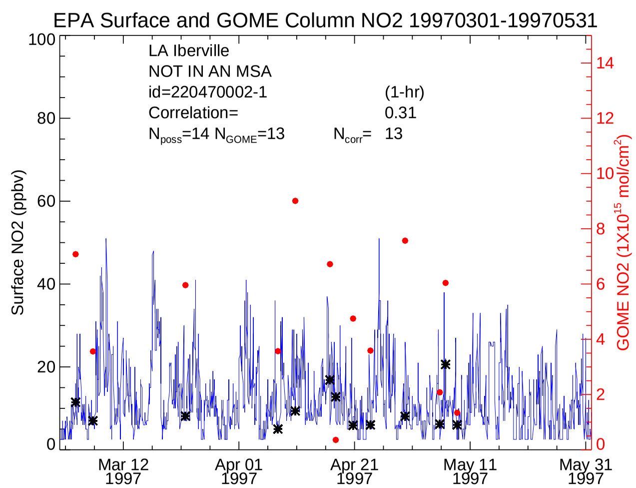
Spring (3/1/97-5/31/97)

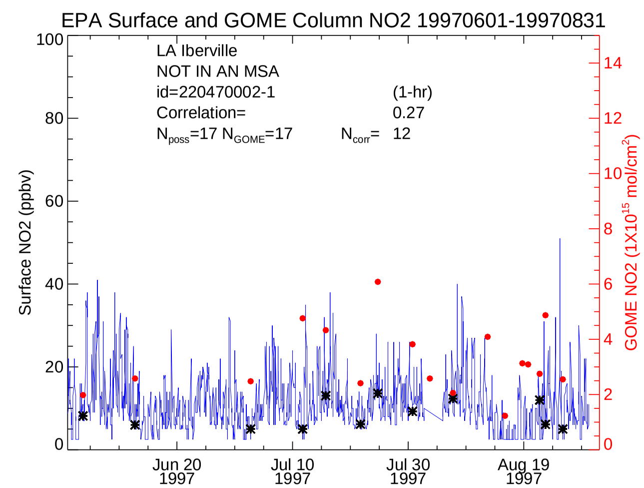
Insufficient Coincident Data

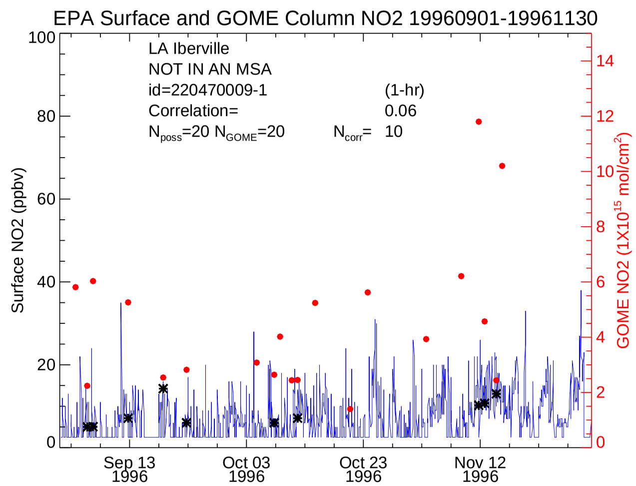
Summer (6/1/97-8/31/97)


EPA Surface and GOME Column NO2 19960901-19961130
LA Iberville
NOT IN AN MSA
id=220470002-1
Correlation=
(1-hr)
0.29
N_{poss}=21 N_{GOME}=21
N_{corr}= 20
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996


Insufficient Coincident Data
Winter (12/1/96-2/28/97)


EPA Surface and GOME Column NO2 19970301-19970531
LA Iberville
NOT IN AN MSA
id=220470002-1
Correlation=
(1-hr)
0.31
N_{poss}=14 N_{GOME}=13
N_{corr}= 13
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997


EPA Surface and GOME Column NO2 19970601-19970831
LA Iberville
NOT IN AN MSA
id=220470002-1
Correlation=
(1-hr)
0.27
N_{poss}=17 N_{GOME}=17
N_{corr}= 12
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997



Insufficient Coincident Data

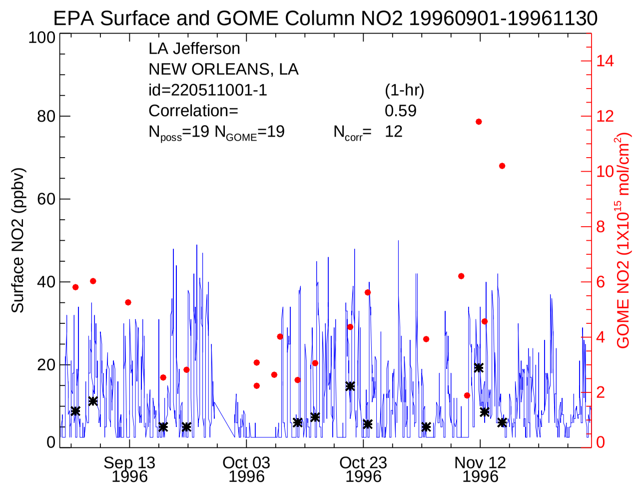
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

Insufficient Coincident Data

Summer (6/1/97-8/31/97)



Insufficient Coincident Data

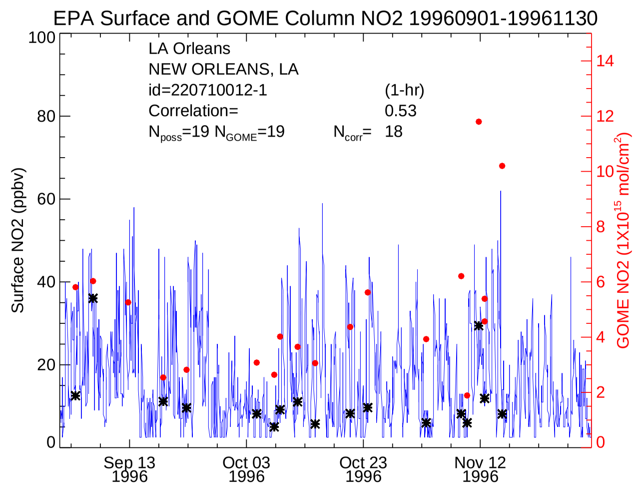
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

Insufficient Coincident Data

Summer (6/1/97-8/31/97)

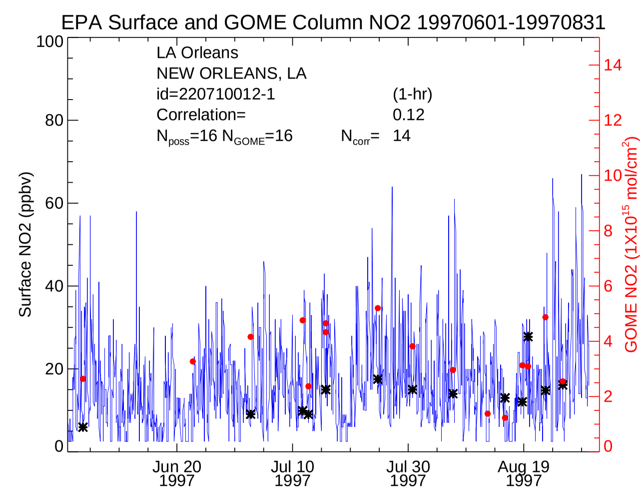


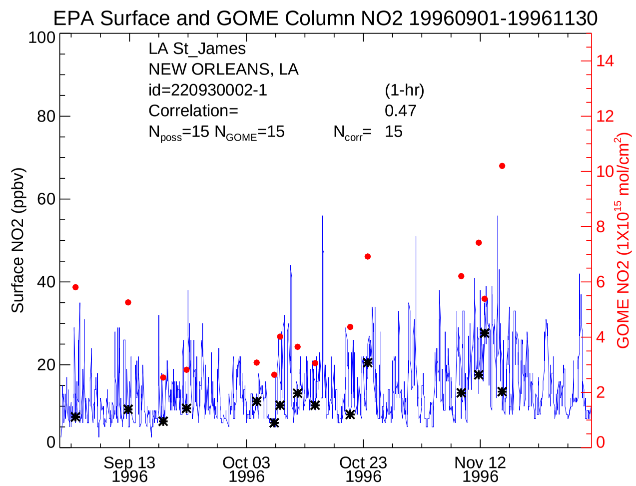
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



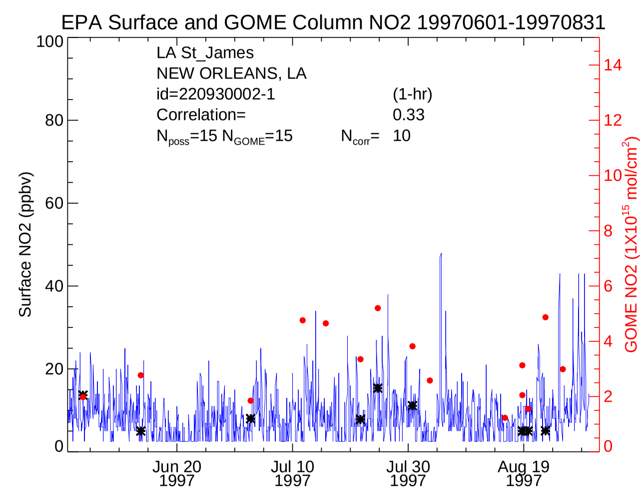


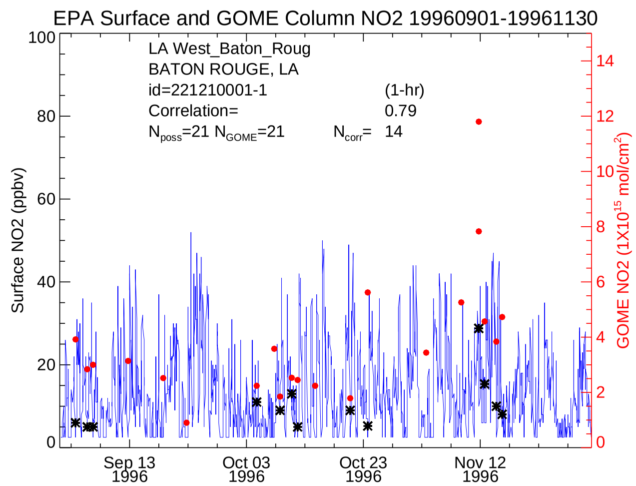
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



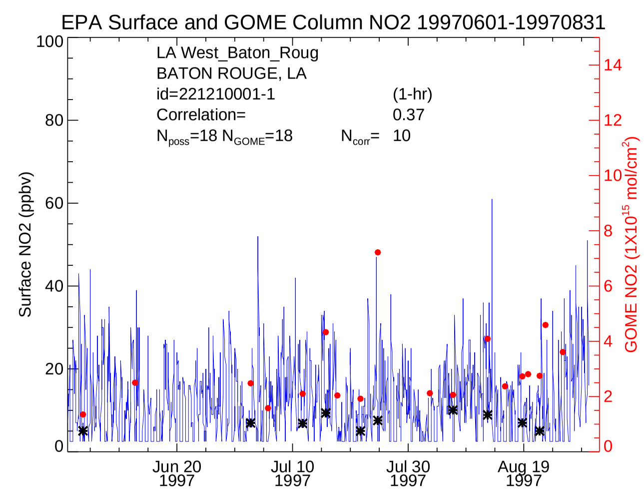


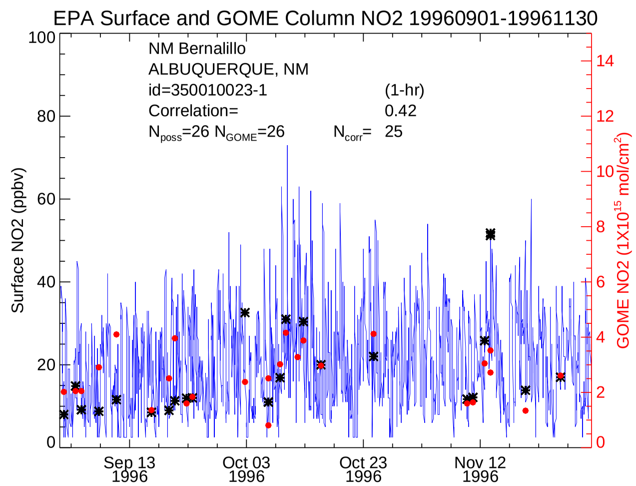
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

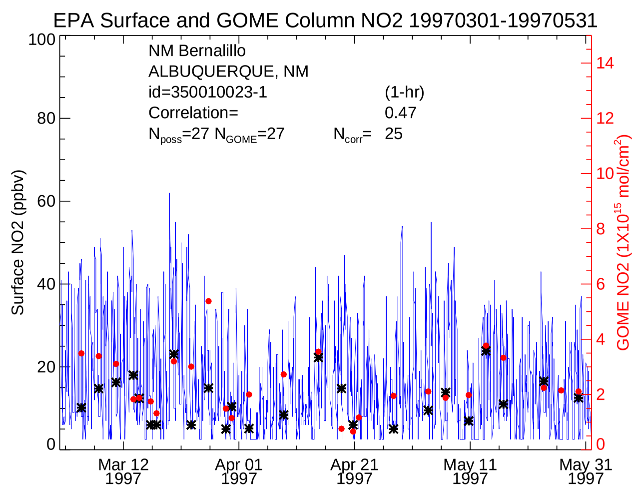
Spring (3/1/97-5/31/97)

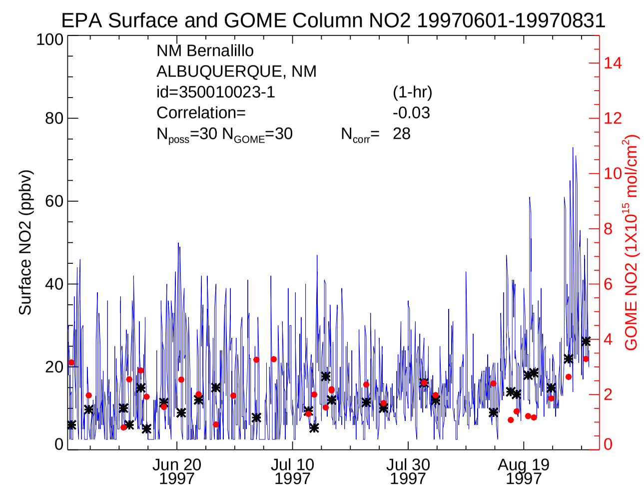


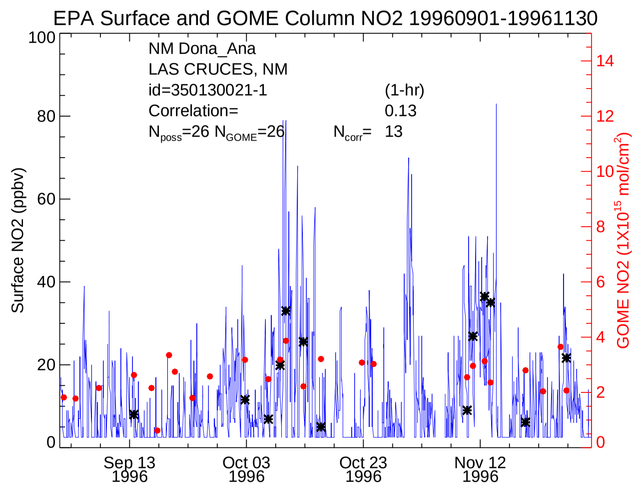


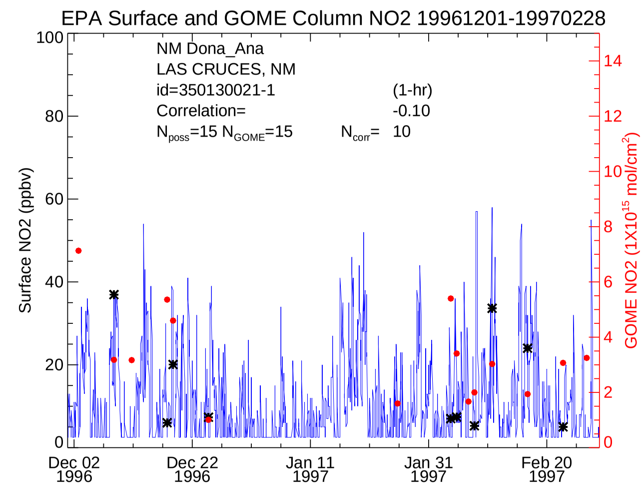
Insufficient Coincident Data

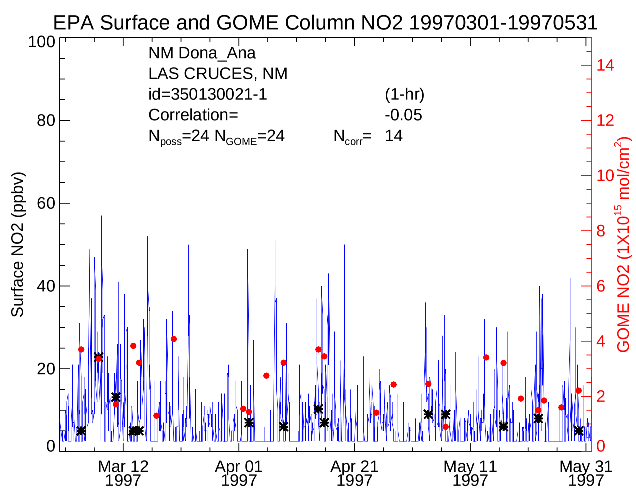
Winter (12/1/96-2/28/97)





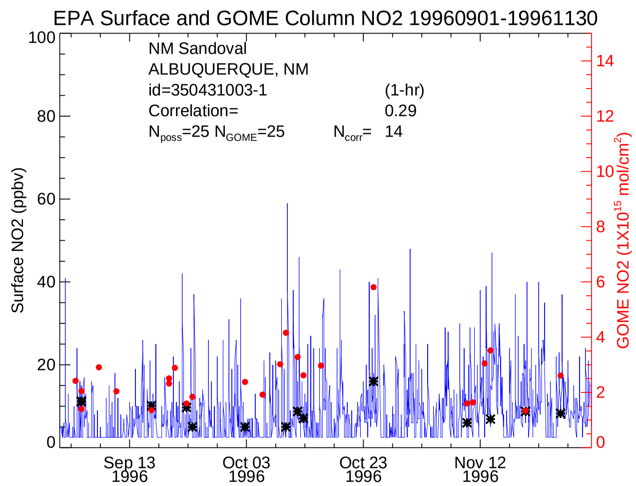






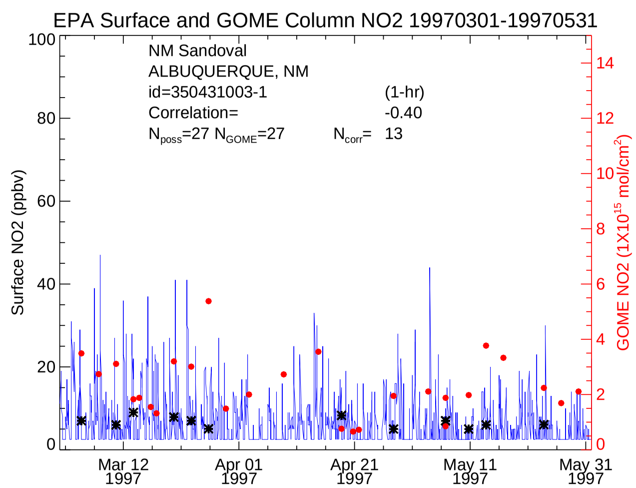
Insufficient Coincident Data

Summer (6/1/97-8/31/97)



Insufficient Coincident Data

Winter (12/1/96-2/28/97)



Insufficient Coincident Data

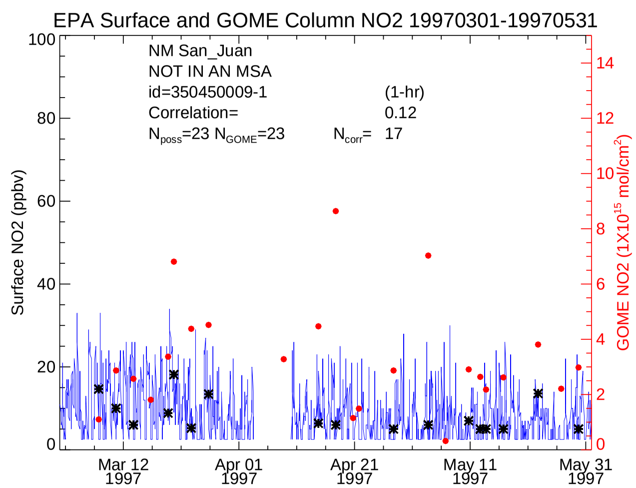
Summer (6/1/97-8/31/97)

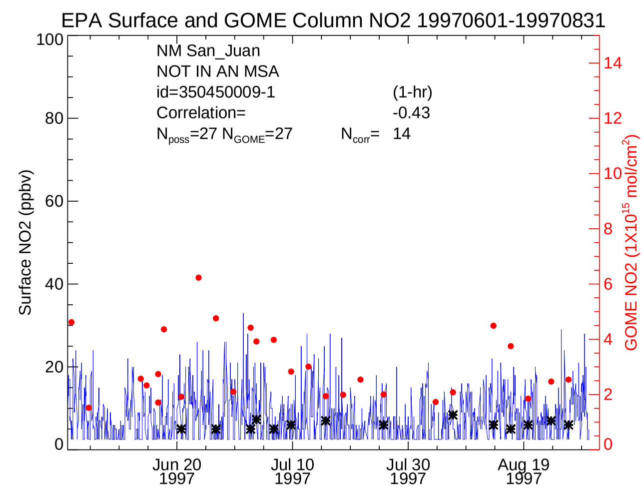
Insufficient Coincident Data

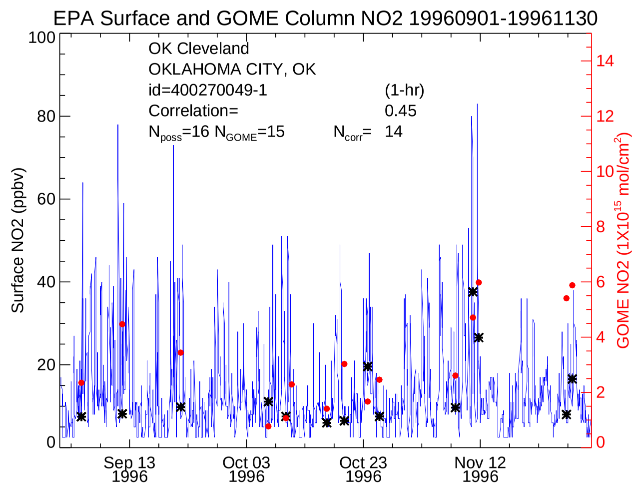
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

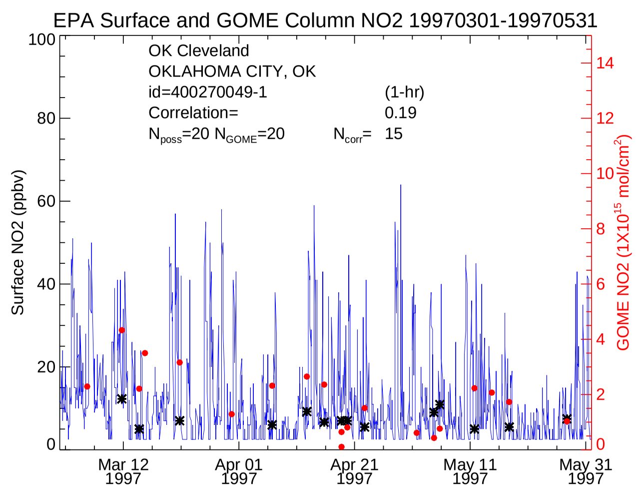






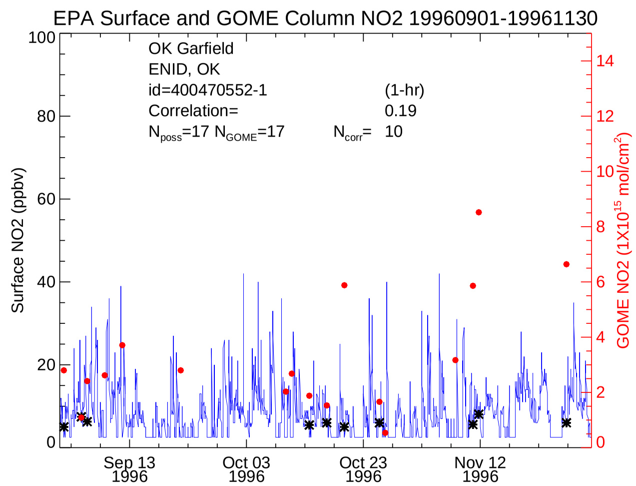
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



Insufficient Coincident Data

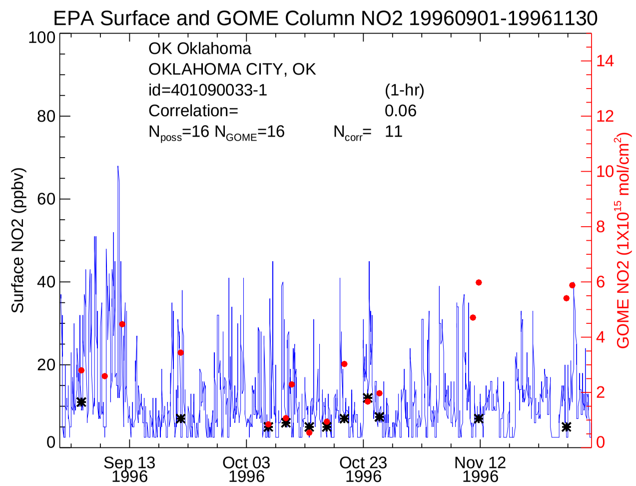
Summer (6/1/97-8/31/97)



Insufficient Coincident Data
Winter (12/1/96-2/28/97)

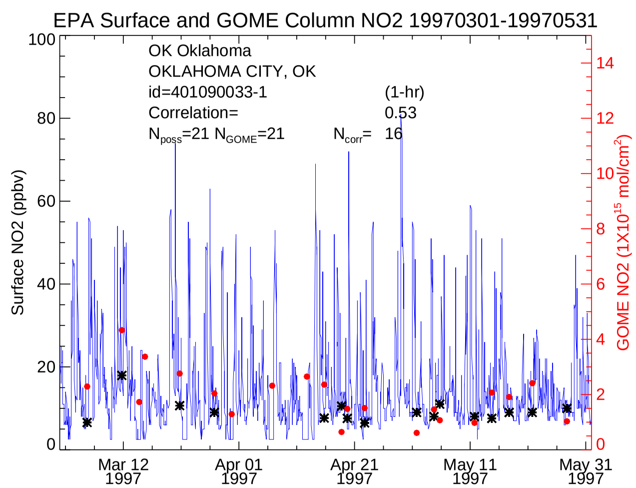
Insufficient Coincident Data
Spring (3/1/97-5/31/97)

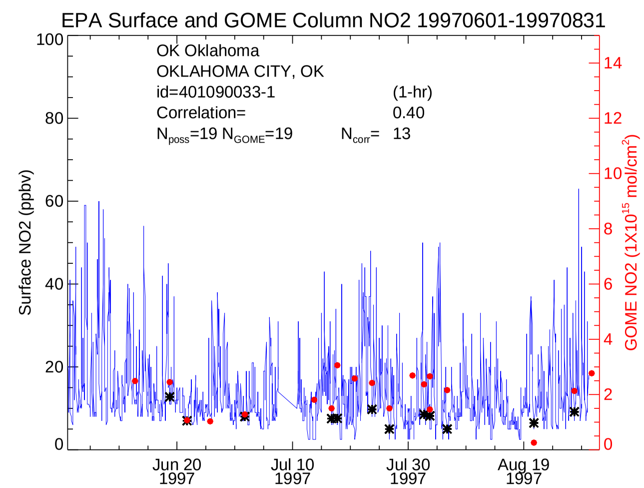
Insufficient Coincident Data
Summer (6/1/97-8/31/97)

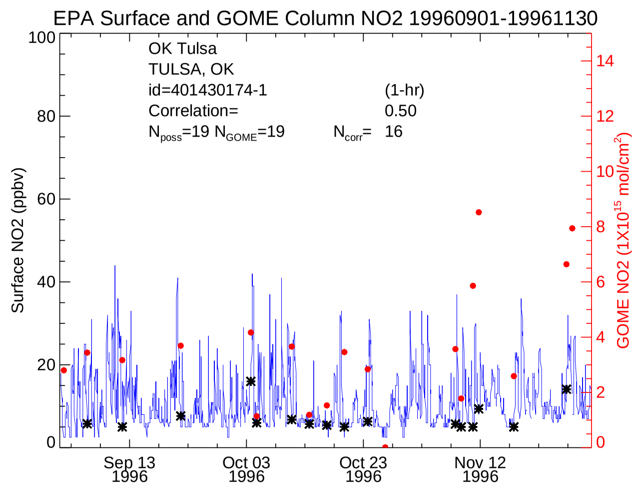


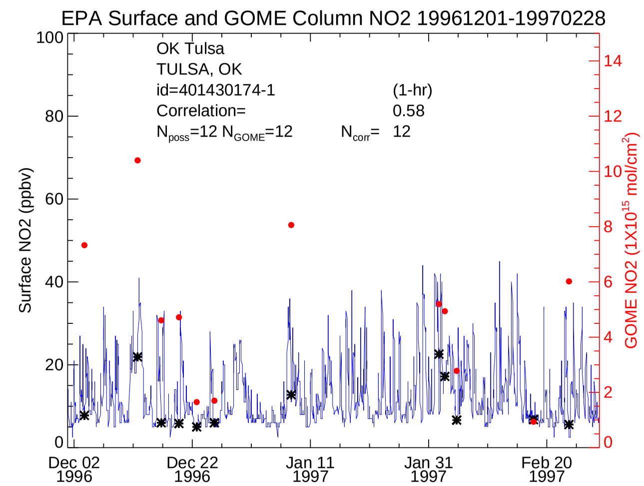
Insufficient Coincident Data

Winter (12/1/96-2/28/97)







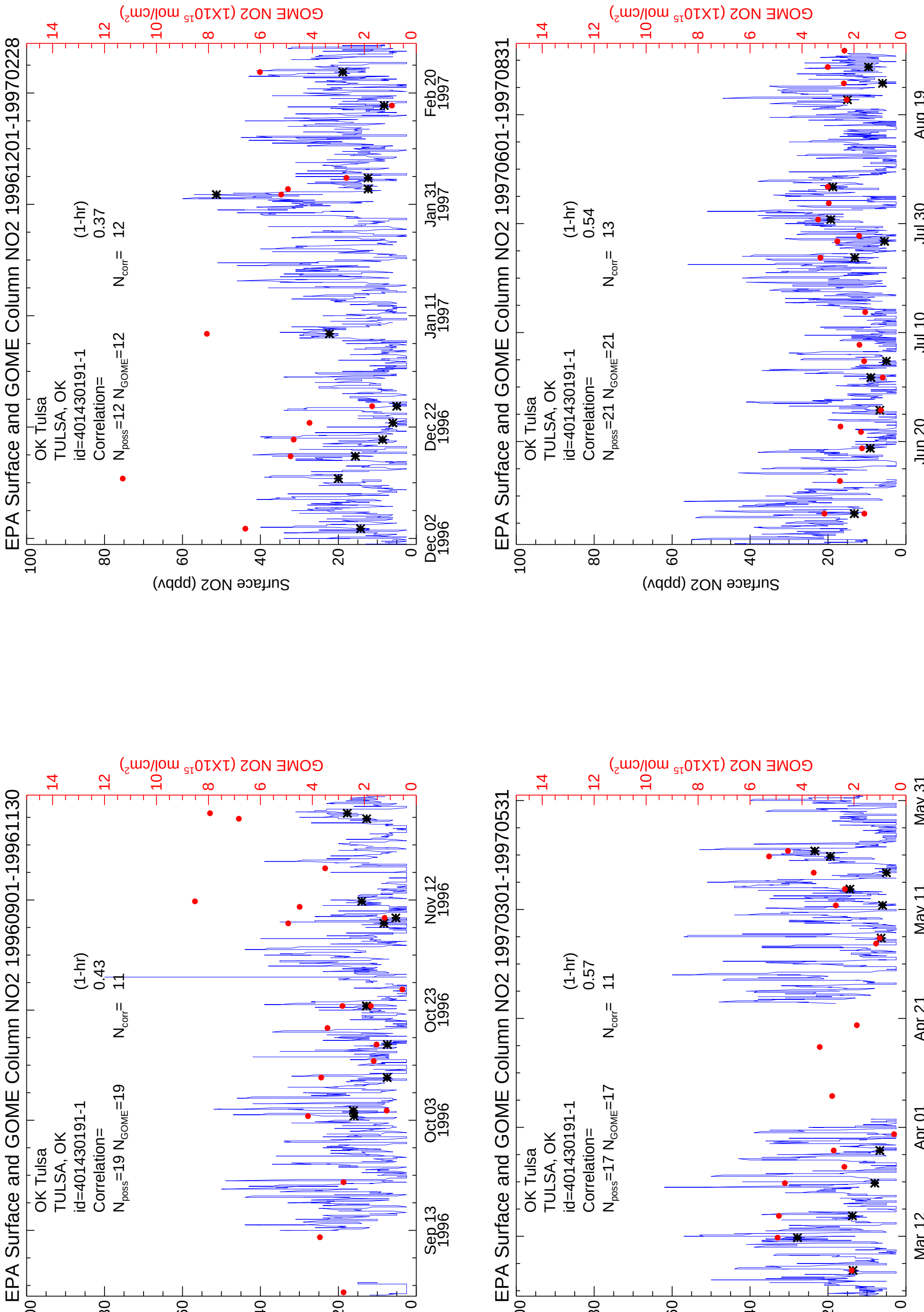


Insufficient Coincident Data

Spring (3/1/97-5/31/97)

Insufficient Coincident Data

Summer (6/1/97-8/31/97)



EPA Surface and GOME Column NO2 19960901-19961130
OK Tulsa
TULSA, OK
id=401430191-1
Correlation= (1-hr) 0.43
N_{poss}=19 N_{GOME}=19 N_{corr}= 11
EPA Surface and GOME Column NO2 19961201-19970228
OK Tulsa
TULSA, OK
id=401430191-1
Correlation= (1-hr) 0.37
N_{poss}=12 N_{GOME}=12 N_{corr}= 12
EPA Surface and GOME Column NO2 19970301-19970531
OK Tulsa
TULSA, OK
id=401430191-1
Correlation= (1-hr) 0.57
N_{poss}=17 N_{GOME}=17 N_{corr}= 11
EPA Surface and GOME Column NO2 19970601-19970831
OK Tulsa
TULSA, OK
id=401430191-1
Correlation= (1-hr) 0.54
N_{poss}=21 N_{GOME}=21 N_{corr}= 13
Surface NO2 (ppbv)
GOME NO2 ($1X10^{15}$ mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

Insufficient Coincident Data

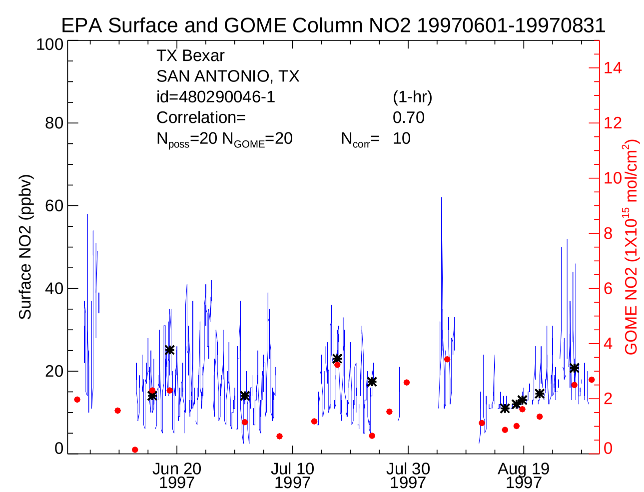
Fall (9/1/96-11/30/96)

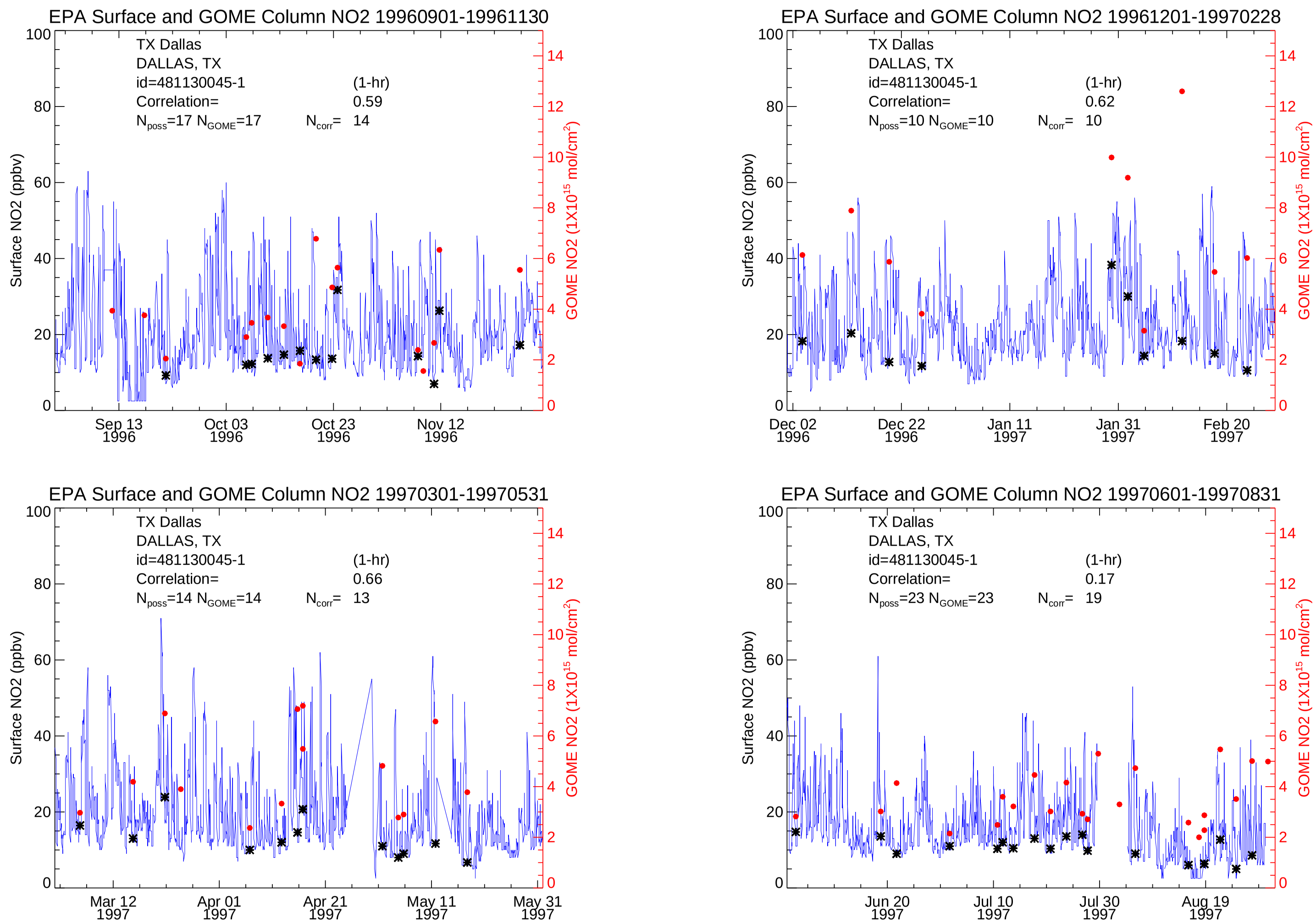
Insufficient Coincident Data

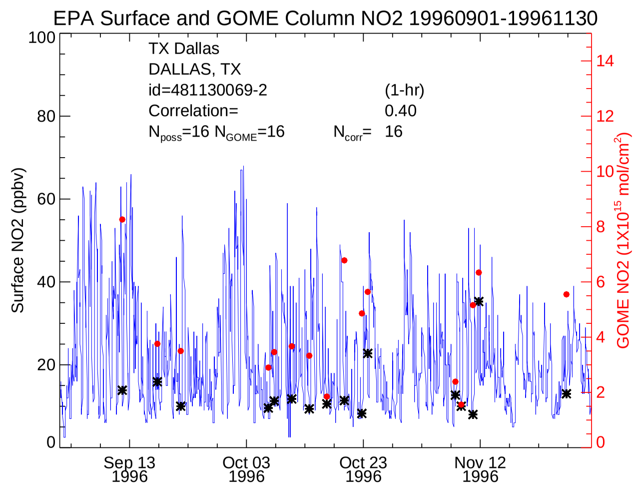
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

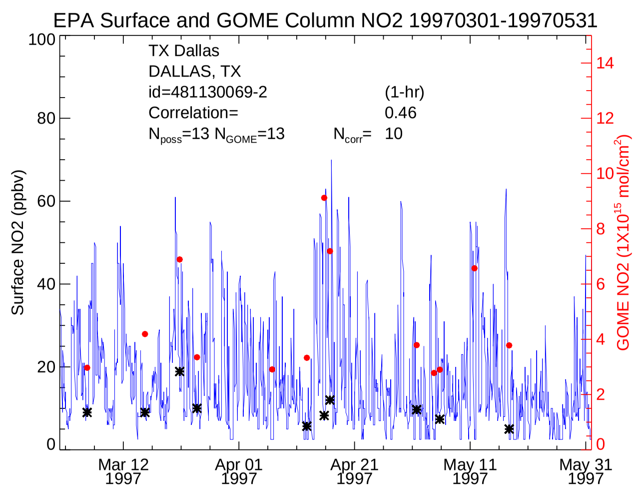


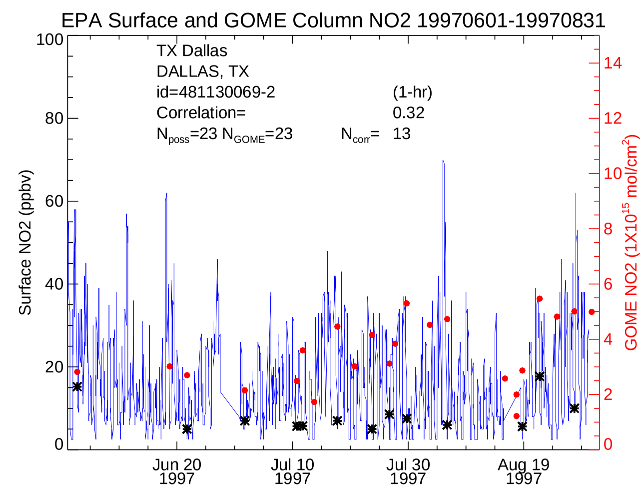

EPA Surface and GOME Column NO2 19960901-19961130
TX Dallas
DALLAS, TX
id=481130045-1
Correlation=
Nposs=17 NGOME=17
(1-hr)
0.59
Ncorr= 14
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
EPA Surface and GOME Column NO2 19961201-19970228
TX Dallas
DALLAS, TX
id=481130045-1
Correlation=
Nposs=10 NGOME=10
(1-hr)
0.62
Ncorr= 10
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
EPA Surface and GOME Column NO2 19970301-19970531
TX Dallas
DALLAS, TX
id=481130045-1
Correlation=
Nposs=14 NGOME=14
(1-hr)
0.66
Ncorr= 13
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
EPA Surface and GOME Column NO2 19970601-19970831
TX Dallas
DALLAS, TX
id=481130045-1
Correlation=
Nposs=23 NGOME=23
(1-hr)
0.17
Ncorr= 19
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

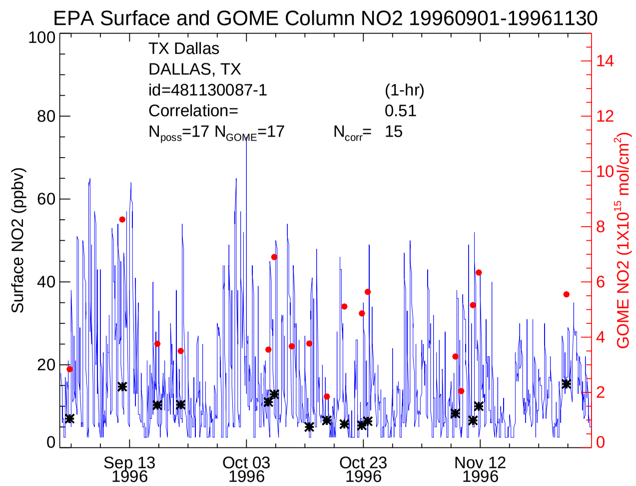


Insufficient Coincident Data

Winter (12/1/96-2/28/97)







Insufficient Coincident Data

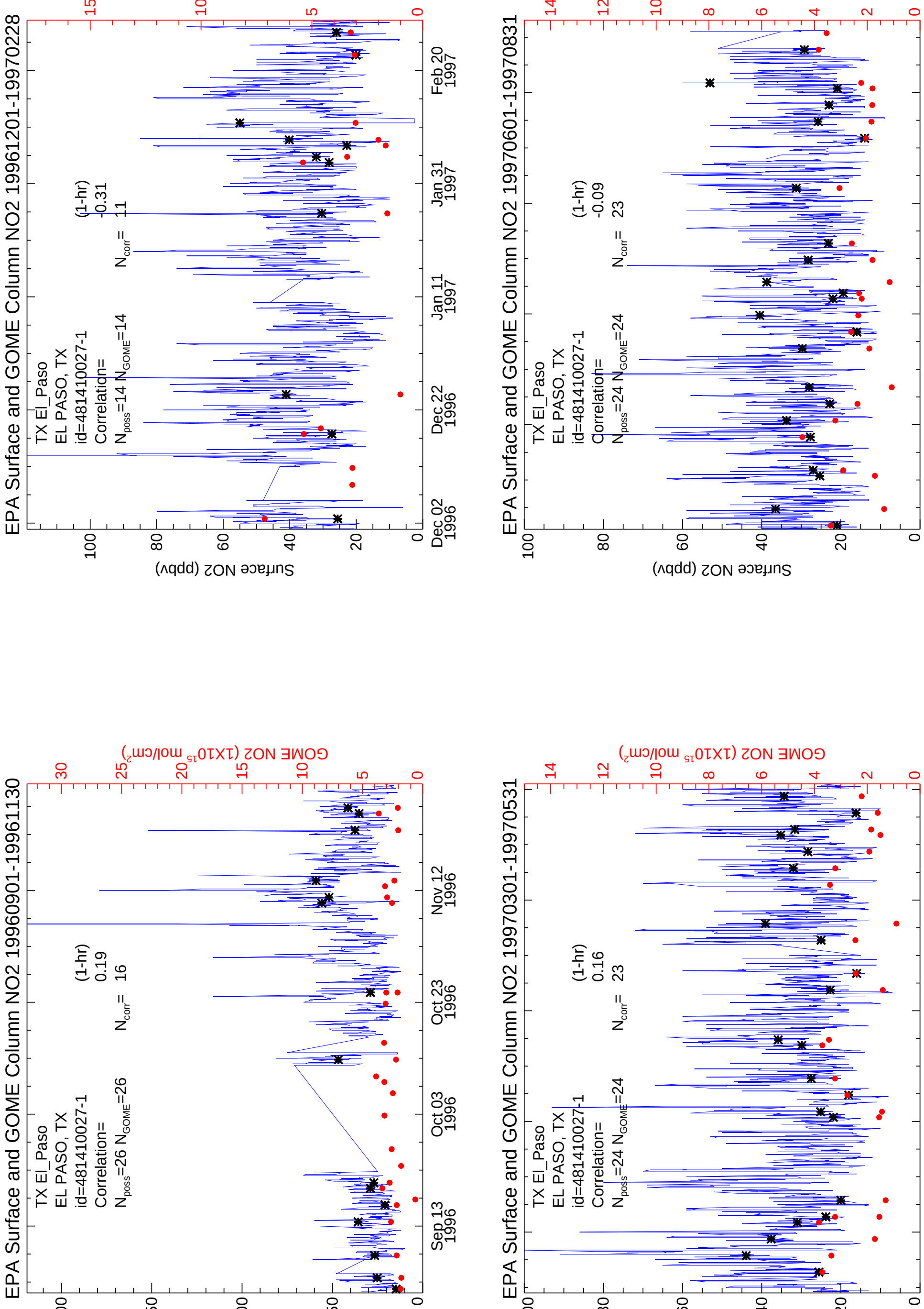
Winter (12/1/96-2/28/97)

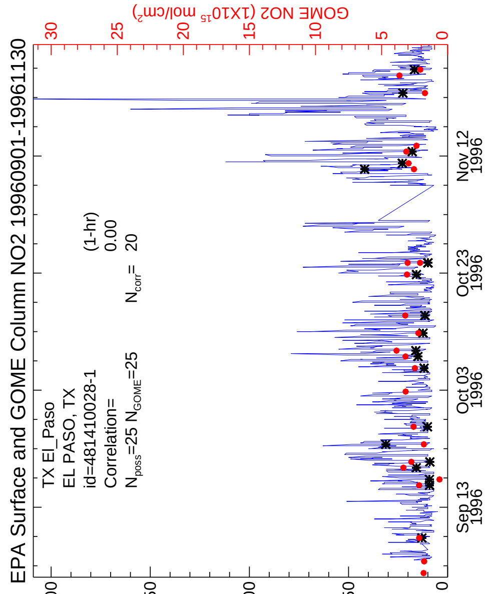
Insufficient Coincident Data

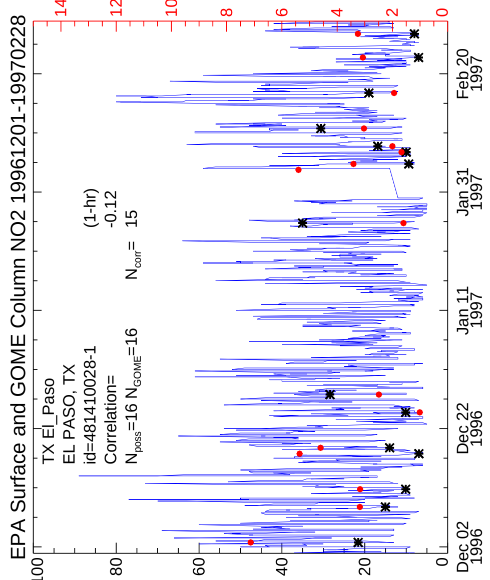
Spring (3/1/97-5/31/97)

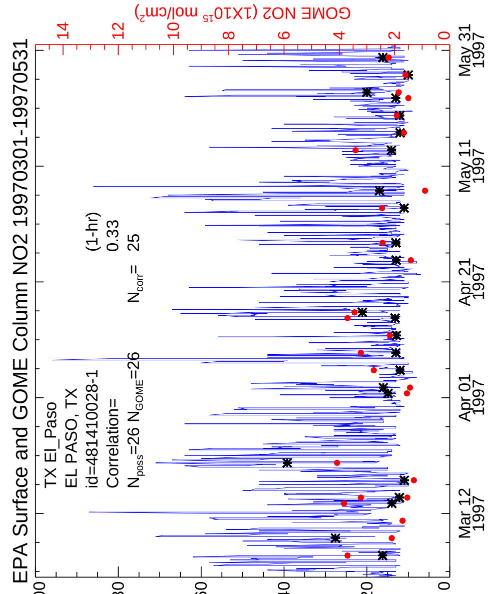
Insufficient Coincident Data

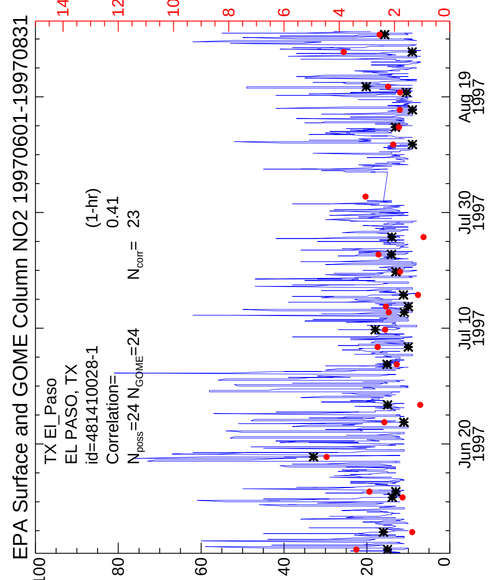
Summer (6/1/97-8/31/97)

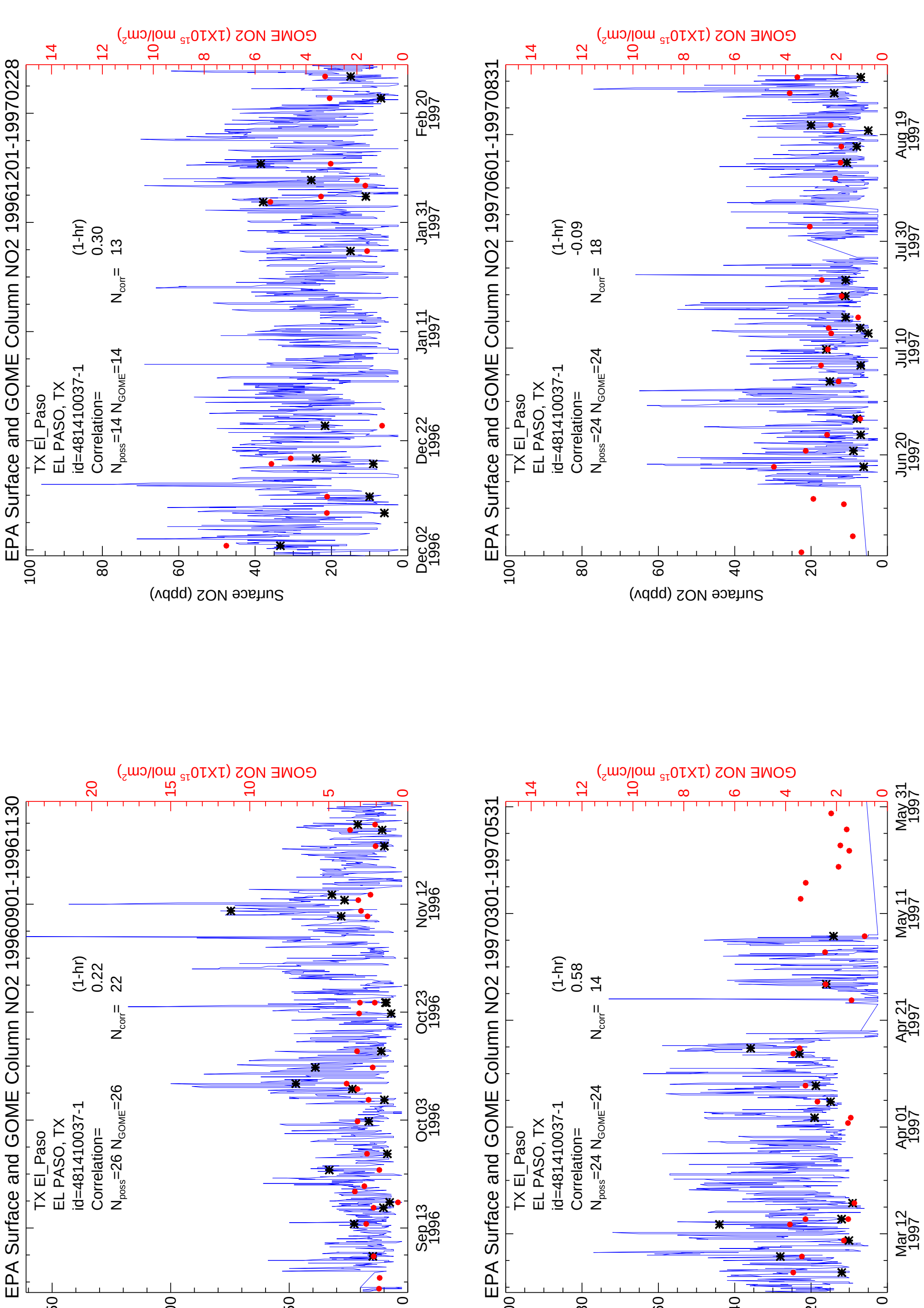

EPA Surface and GOME Column NO2 19960901-19961130
TX El_Paso
EL PASO, TX
id=481410027-1
Correlation=
Nposs=26 NGOME=26
(1-hr)
0.19
Ncorr= 16
Surface NO2 (ppbv)
GOME NO2 (1X1015 mol/cm2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
EPA Surface and GOME Column NO2 19961201-19970228
TX El_Paso
EL PASO, TX
id=481410027-1
Correlation=
Nposs=14 NGOME=14
(1-hr)
-0.31
Ncorr= 11
Surface NO2 (ppbv)
GOME NO2 (1X1015 mol/cm2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
EPA Surface and GOME Column NO2 19970301-19970531
TX El_Paso
EL PASO, TX
id=481410027-1
Correlation=
Nposs=24 NGOME=24
(1-hr)
0.16
Ncorr= 23
Surface NO2 (ppbv)
GOME NO2 (1X1015 mol/cm2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
EPA Surface and GOME Column NO2 19970601-19970831
TX El_Paso
EL PASO, TX
id=481410027-1
Correlation=
Nposs=24 NGOME=24
(1-hr)
-0.09
Ncorr= 23
Surface NO2 (ppbv)
GOME NO2 (1X1015 mol/cm2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

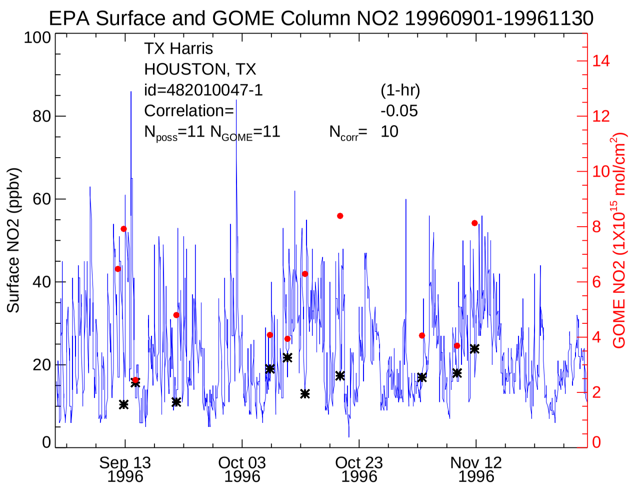

EPA Surface and GOME Column NO2 19960901-19961130
TX El_Paso
EL PASO, TX
id=481410028-1
Correlation=
N_{poss}=25 N_{GOME}=25
(1-hr)
0.00
N_{corr}= 20
Surface NO2 (ppbv)
GOME NO2 ($1X10^{15}$ mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996


EPA Surface and GOME Column NO2 19961201-19970228
TX El_Paso
EL PASO, TX
id=481410028-1
Correlation=
N_{poss}=16 N_{GOME}=16
(1-hr)
-0.12
N_{corr}= 15
Surface NO2 (ppbv)
GOME NO2 ($1X10^{15}$ mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997


EPA Surface and GOME Column NO2 19970301-19970531
TX El_Paso
EL PASO, TX
id=481410028-1
Correlation=
N_{poss}=26 N_{GOME}=26
(1-hr)
0.33
N_{corr}= 25
Surface NO2 (ppbv)
GOME NO2 ($1X10^{15}$ mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997

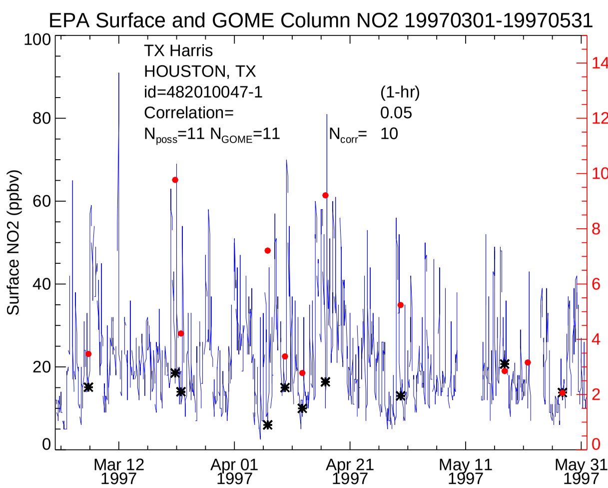

EPA Surface and GOME Column NO2 19970601-19970831
TX El_Paso
EL PASO, TX
id=481410028-1
Correlation=
N_{poss}=24 N_{GOME}=24
(1-hr)
0.41
N_{corr}= 23
Surface NO2 (ppbv)
GOME NO2 ($1X10^{15}$ mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

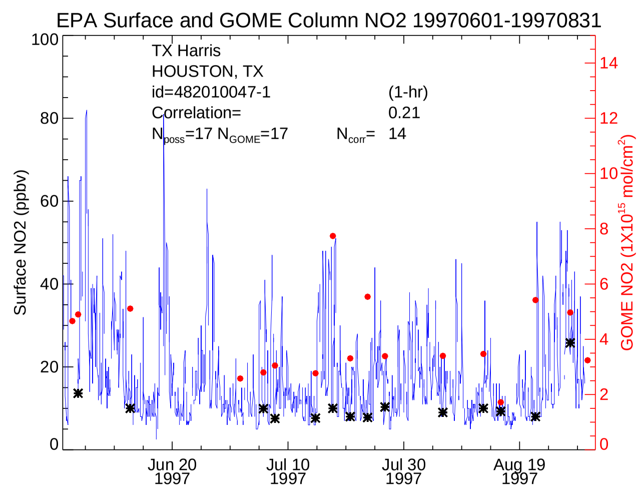

EPA Surface and GOME Column NO2 19960901-19961130
TX El_Paso
EL PASO, TX
id=481410037-1
Correlation= (1-hr) 0.22
N_{poss}=26 N_{GOME}=26
N_{corr}= 22
Surface NO2 (ppbv)
GOME NO2 ($1X10^{15}$ mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
EPA Surface and GOME Column NO2 19961201-19970228
TX El_Paso
EL PASO, TX
id=481410037-1
Correlation= (1-hr) 0.30
N_{poss}=14 N_{GOME}=14
N_{corr}= 13
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
EPA Surface and GOME Column NO2 19970301-19970531
TX El_Paso
EL PASO, TX
id=481410037-1
Correlation= (1-hr) 0.58
N_{poss}=24 N_{GOME}=24
N_{corr}= 14
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
EPA Surface and GOME Column NO2 19970601-19970831
TX El_Paso
EL PASO, TX
id=481410037-1
Correlation= (1-hr) -0.09
N_{poss}=24 N_{GOME}=24
N_{corr}= 18
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997



Insufficient Coincident Data

Winter (12/1/96-2/28/97)





Insufficient Coincident Data

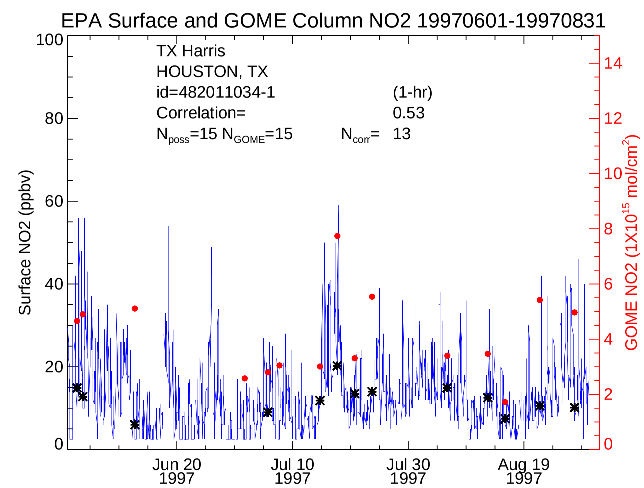
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

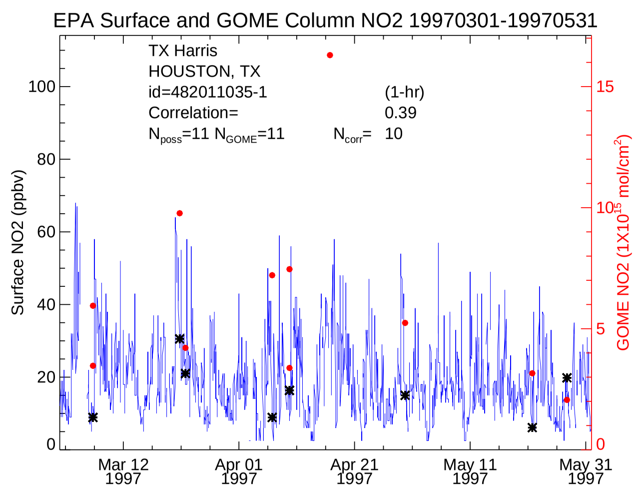


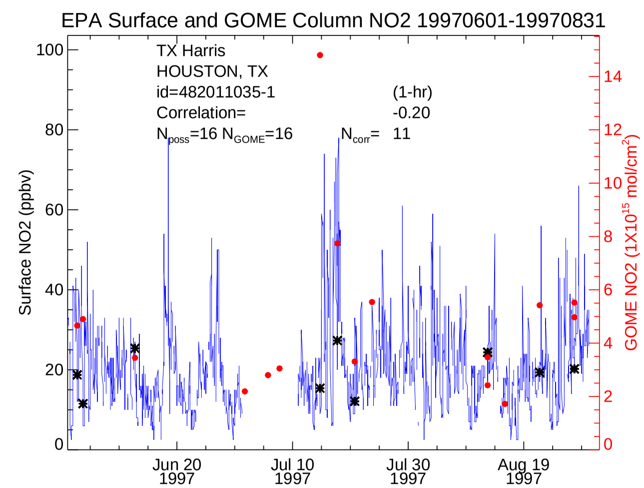
Insufficient Coincident Data

Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)





Insufficient Coincident Data

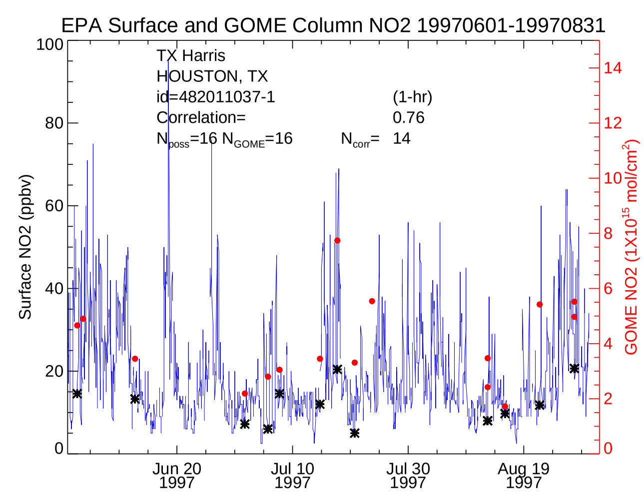
Fall (9/1/96-11/30/96)

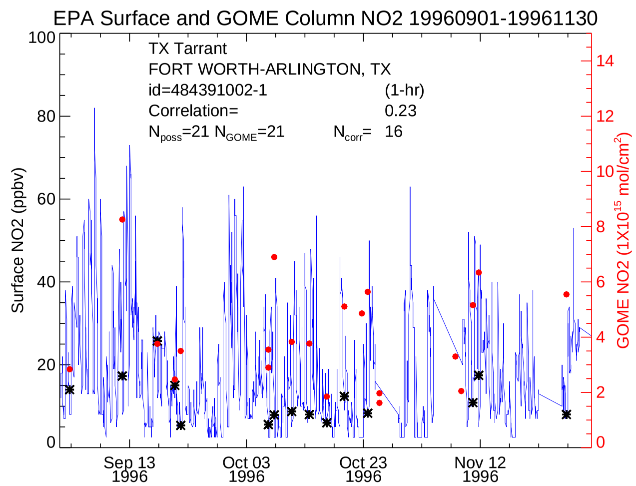
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

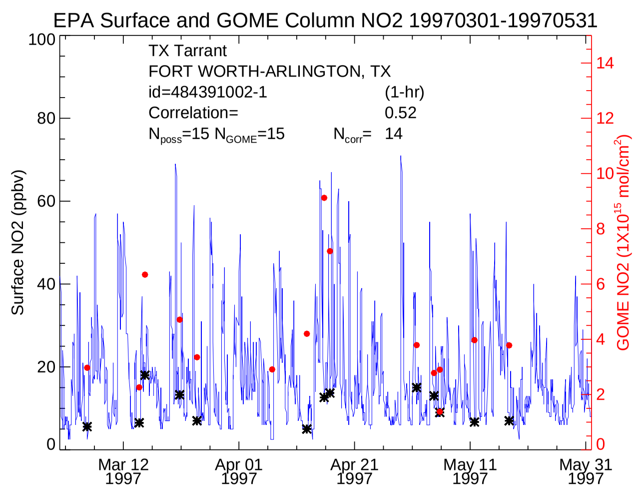
Spring (3/1/97-5/31/97)

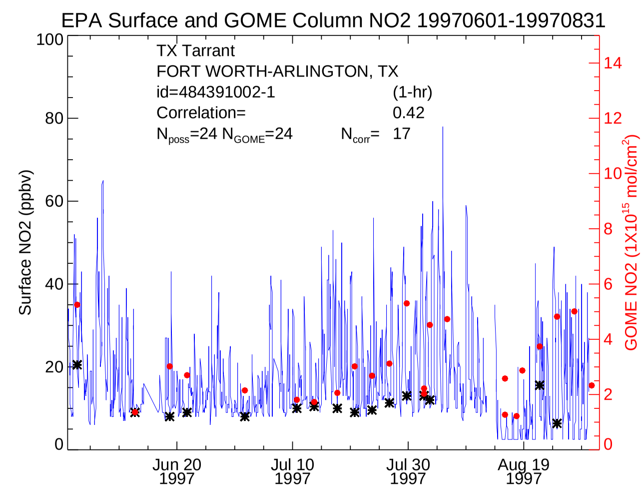


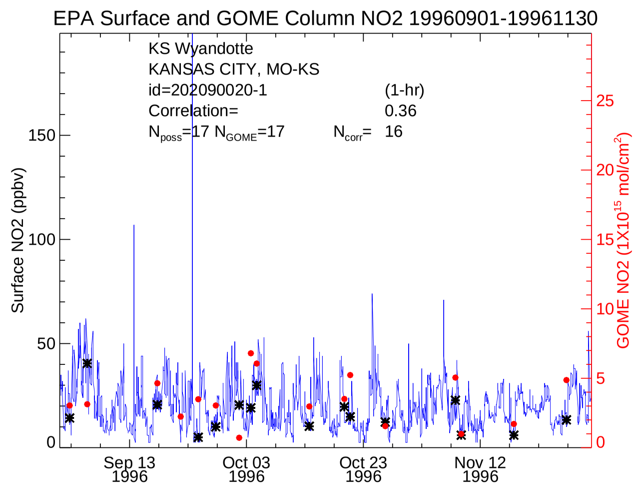


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

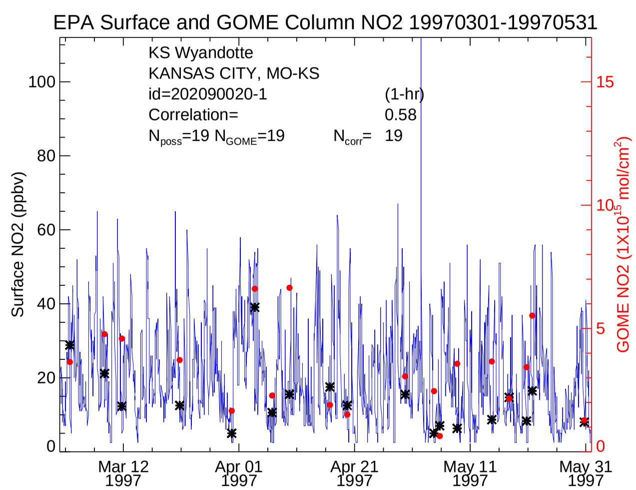


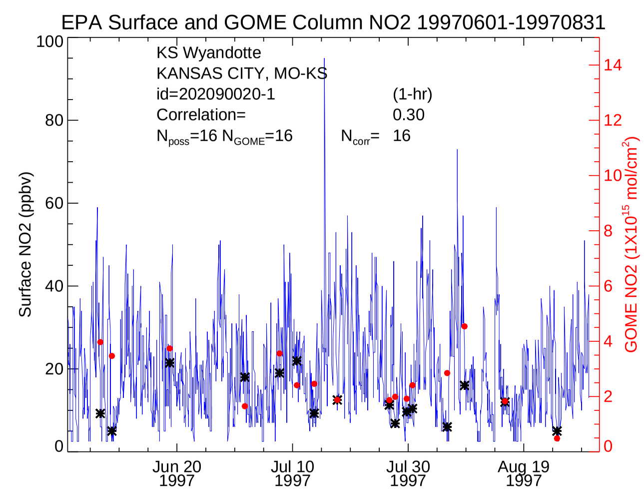


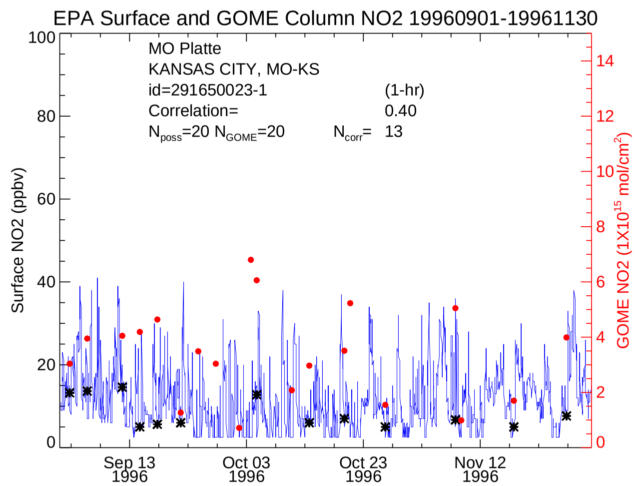


Insufficient Coincident Data

Winter (12/1/96-2/28/97)







Insufficient Coincident Data

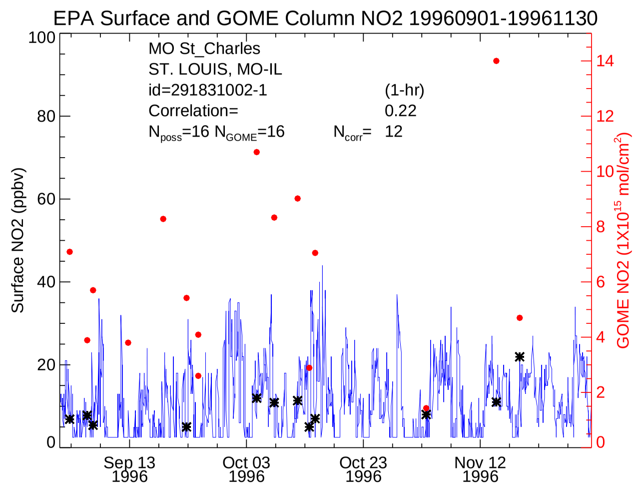
Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

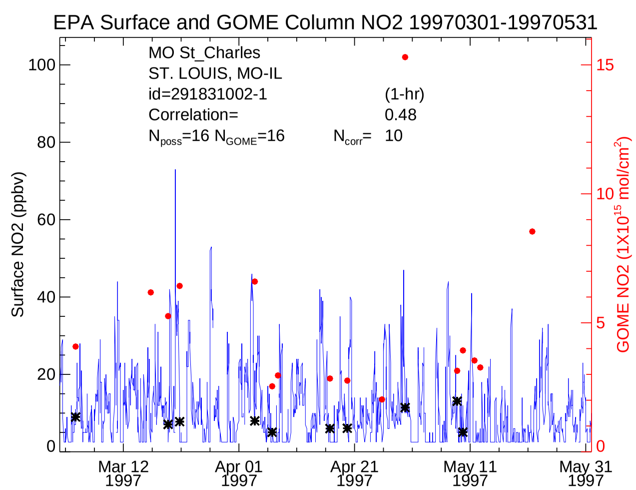
Insufficient Coincident Data

Summer (6/1/97-8/31/97)



Insufficient Coincident Data

Winter (12/1/96-2/28/97)



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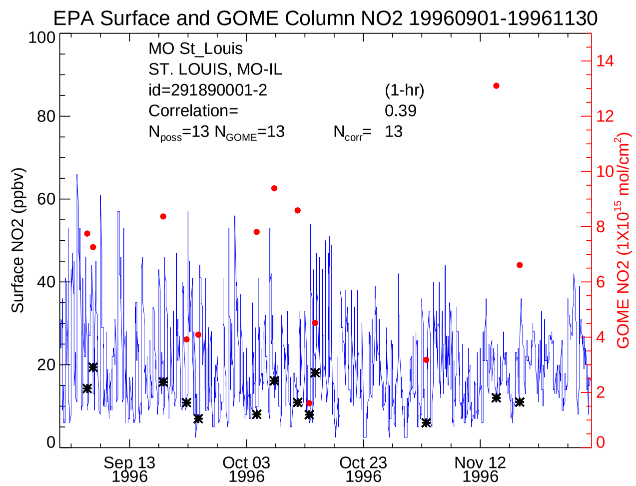
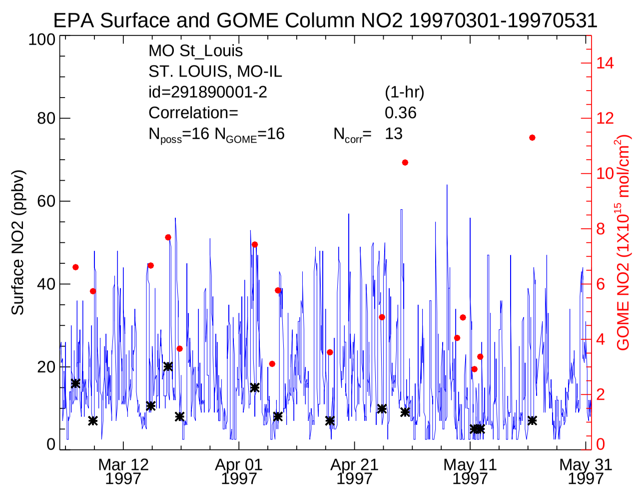
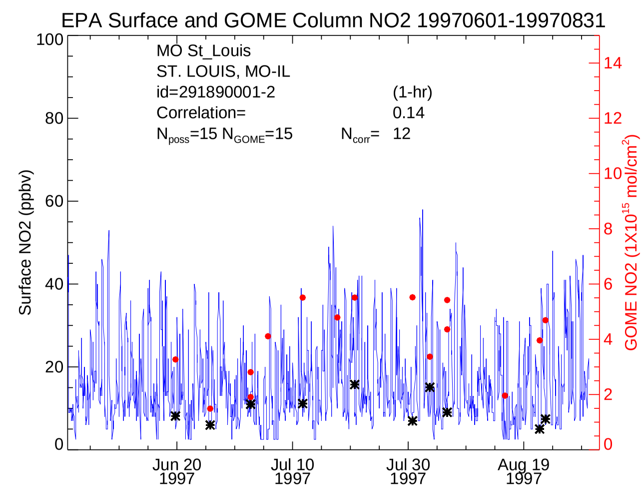
Summer (6/1/97-8/31/97)

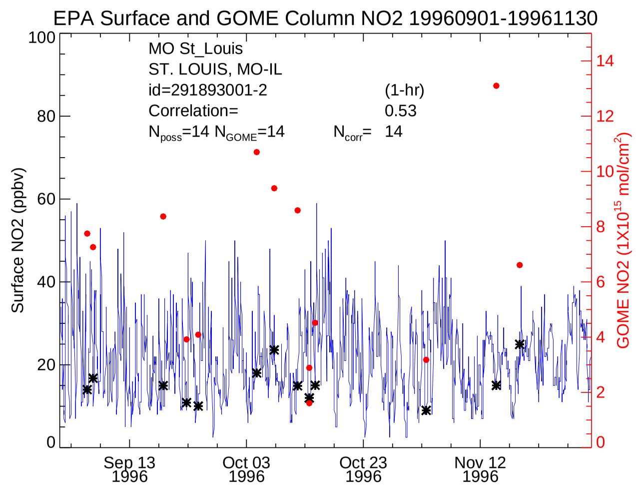


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

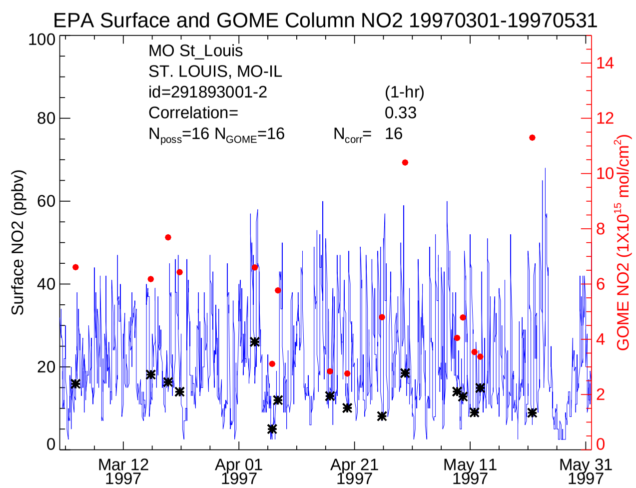


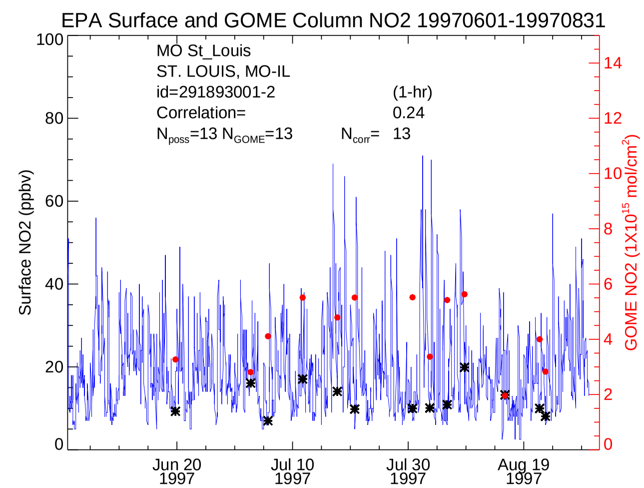


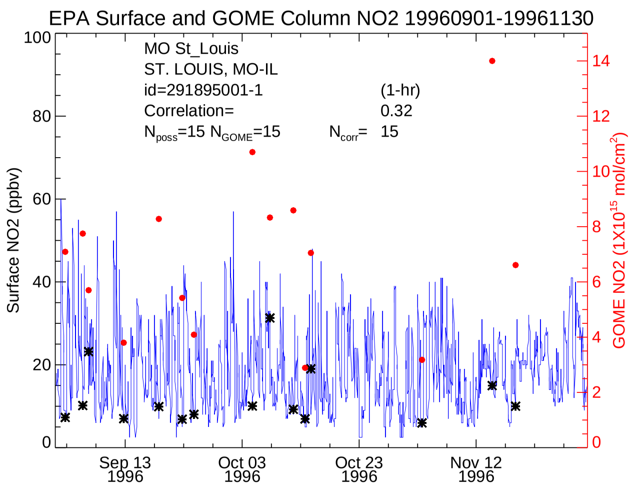


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

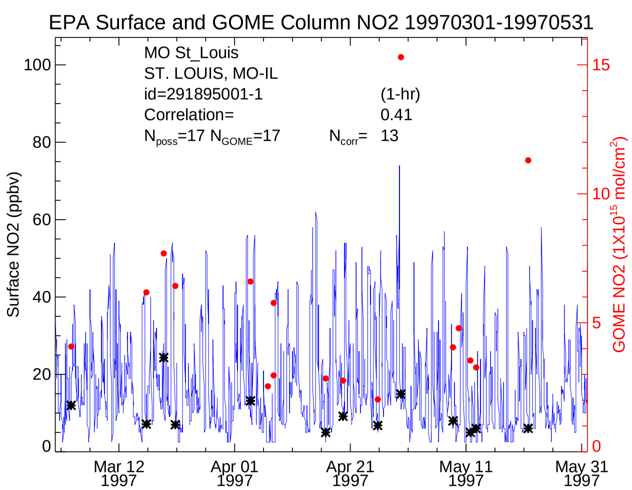


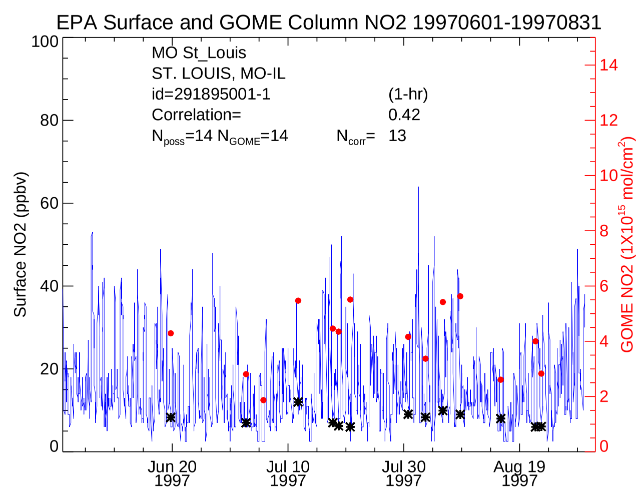


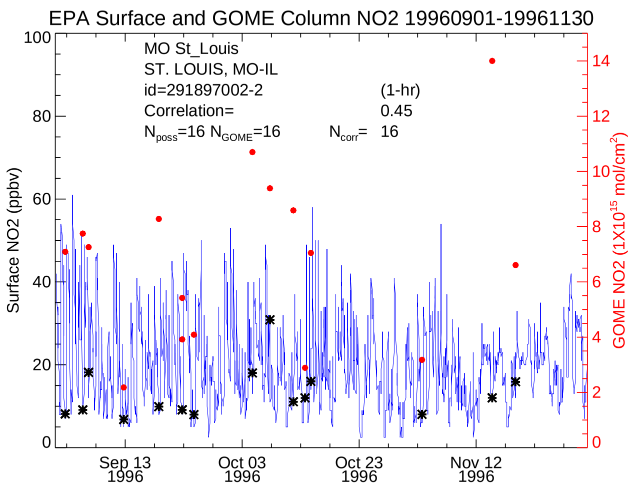


Insufficient Coincident Data

Winter (12/1/96-2/28/97)







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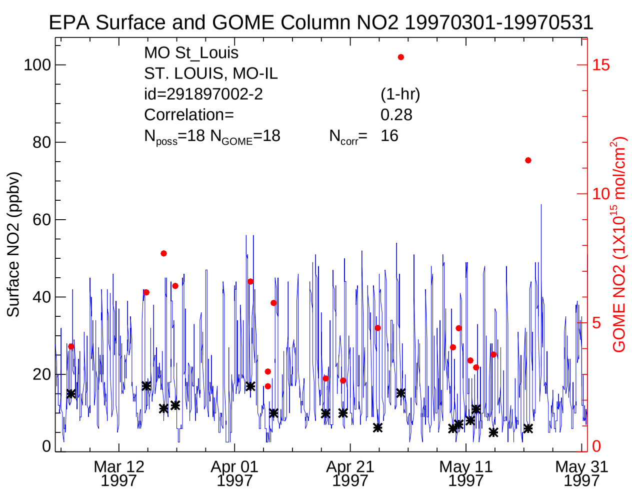
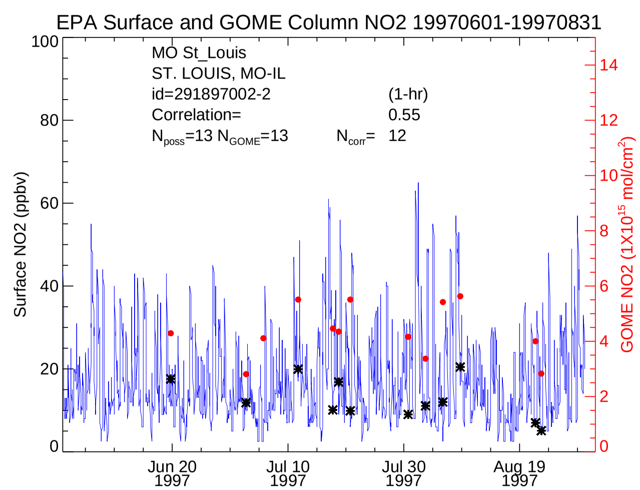
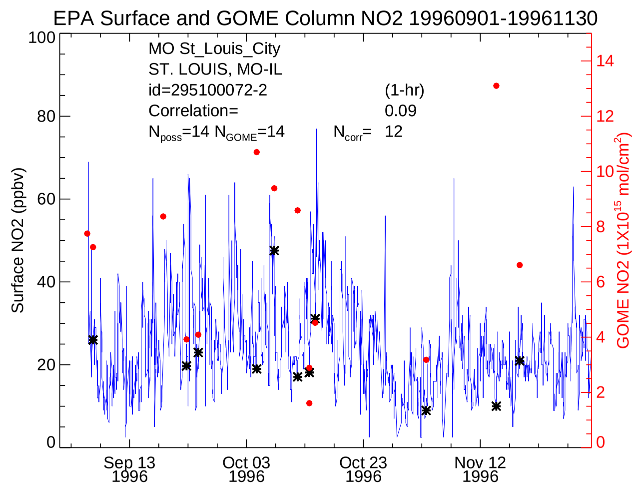
Winter (12/1/96-2/28/97)

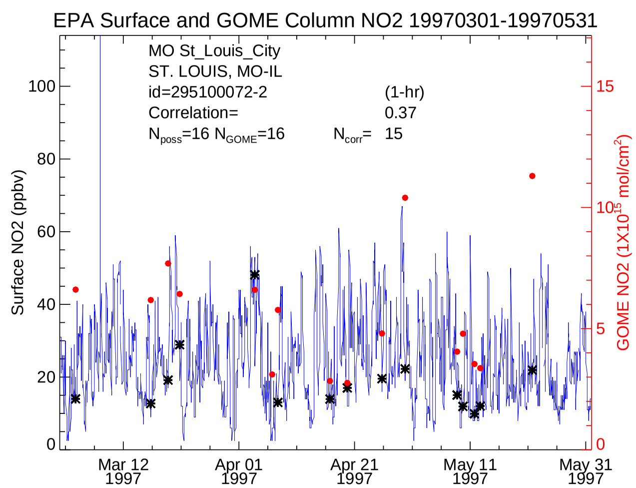


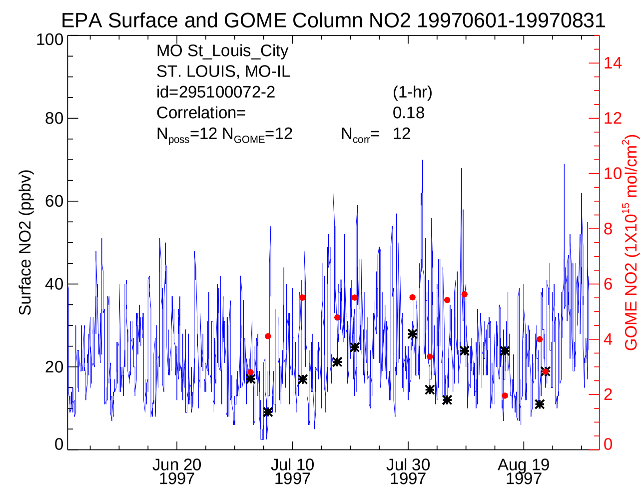


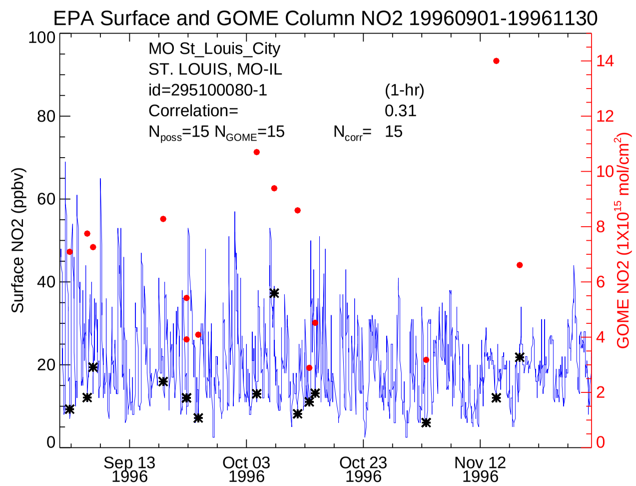


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

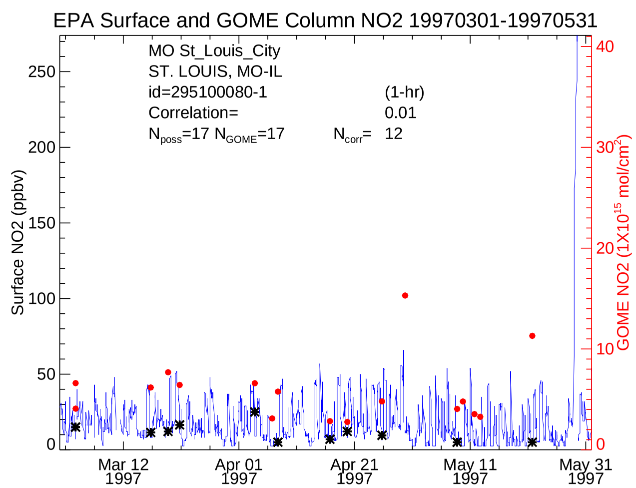


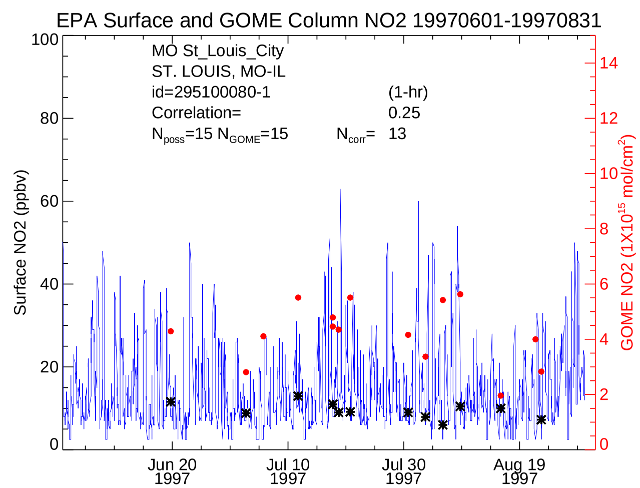


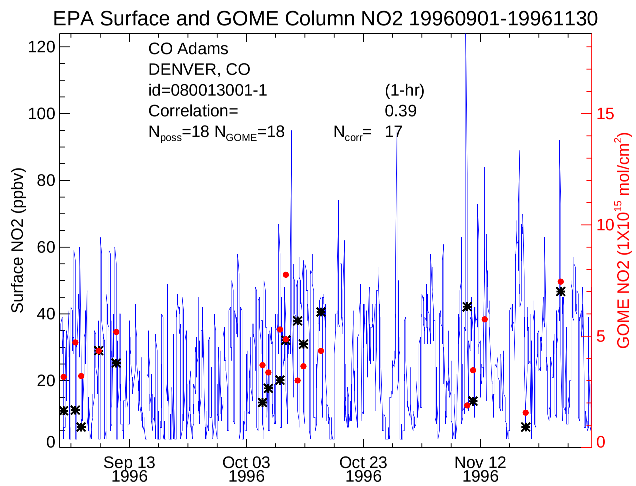


Insufficient Coincident Data

Winter (12/1/96-2/28/97)





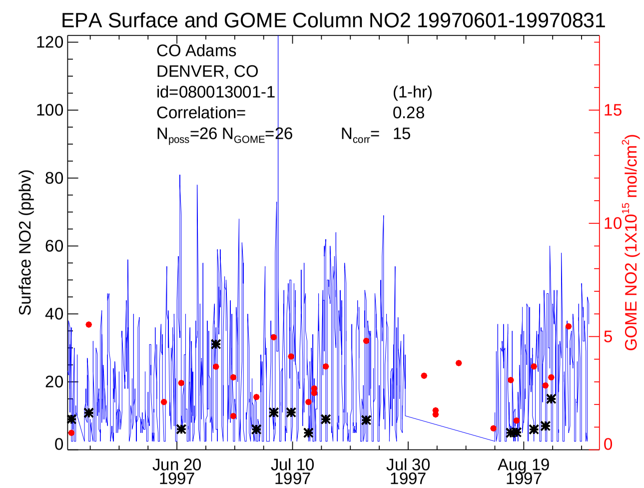


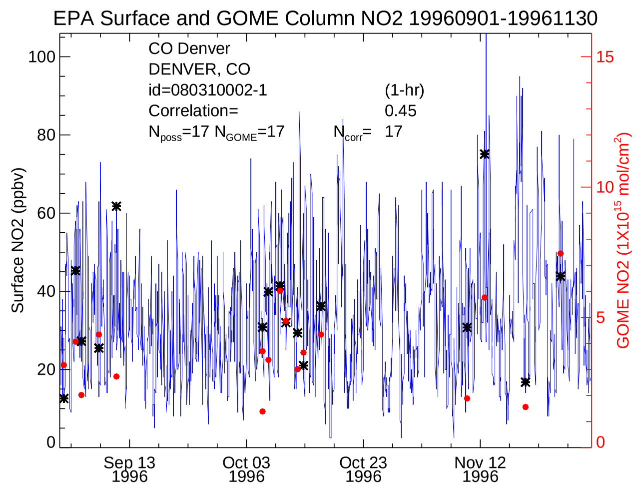
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

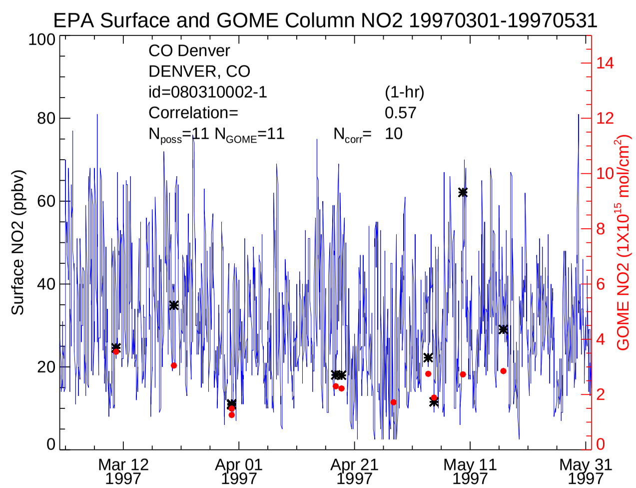
Spring (3/1/97-5/31/97)

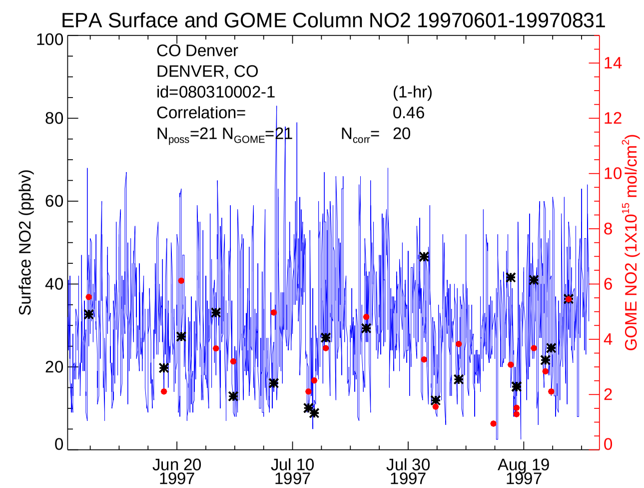


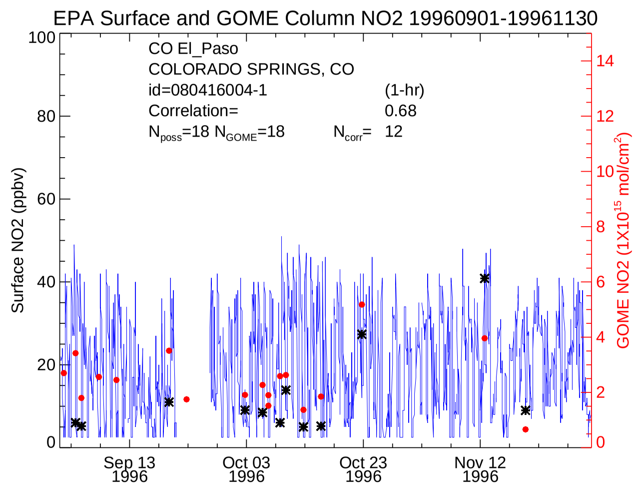


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

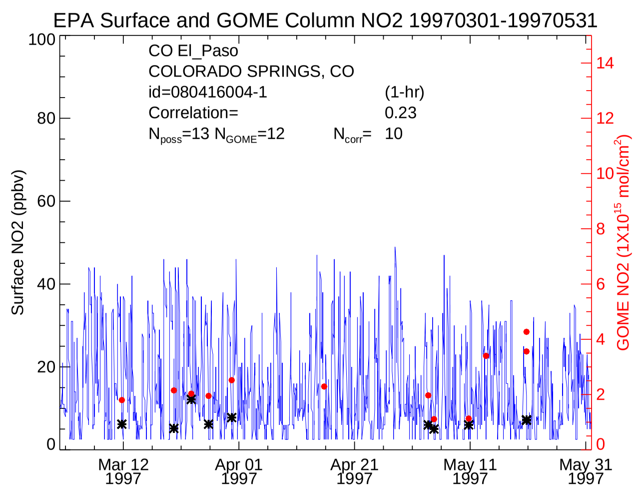


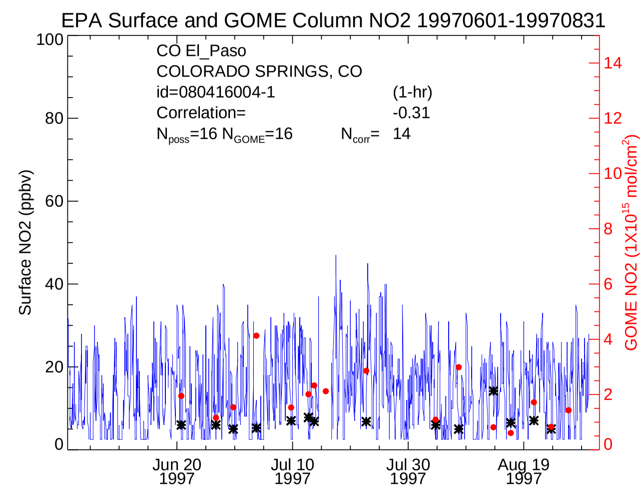


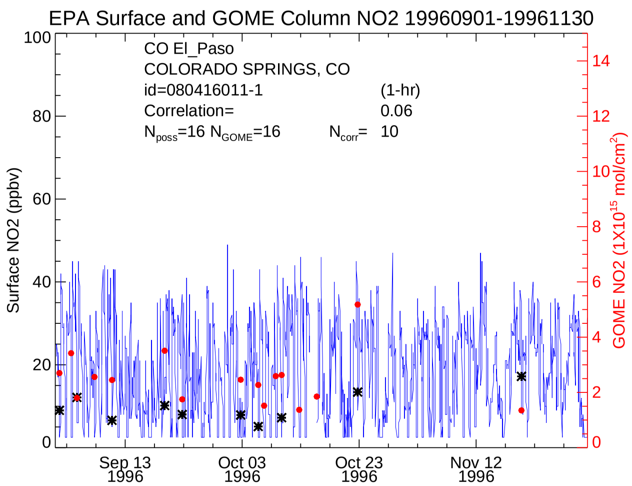


Insufficient Coincident Data

Winter (12/1/96-2/28/97)





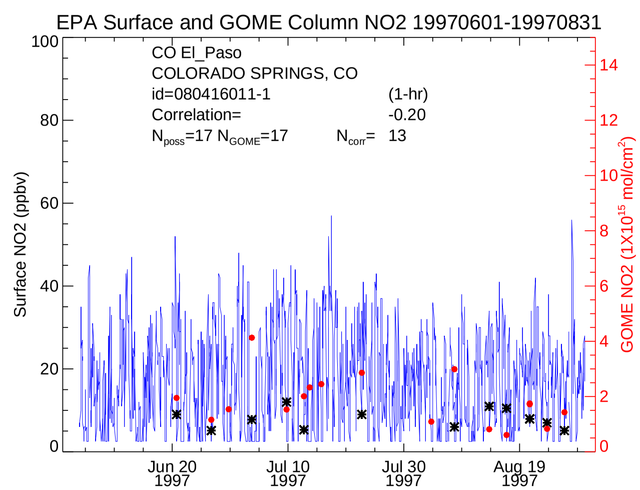


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



Insufficient Coincident Data

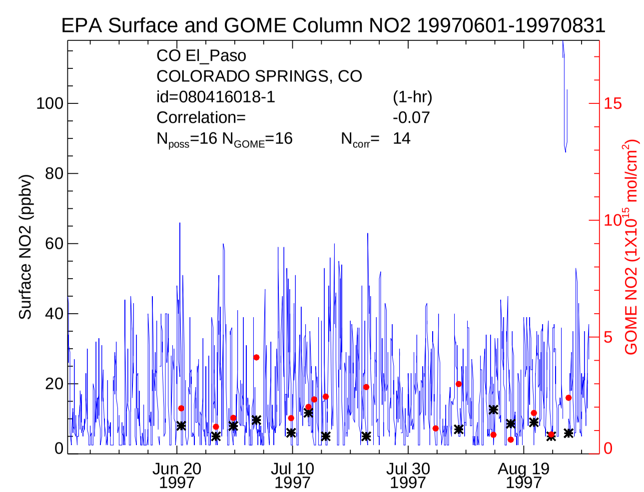
Fall (9/1/96-11/30/96)

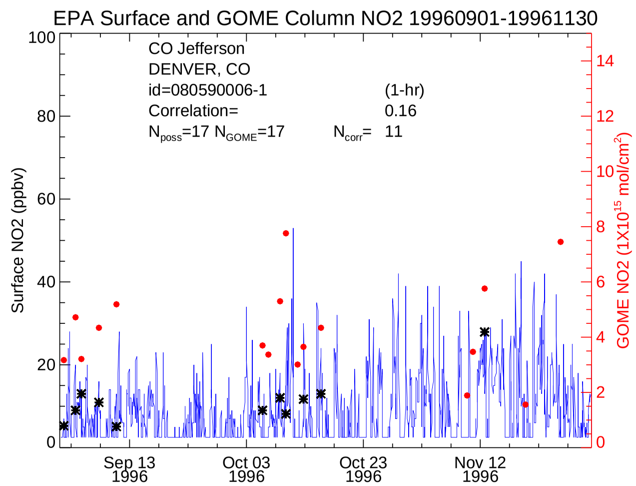
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



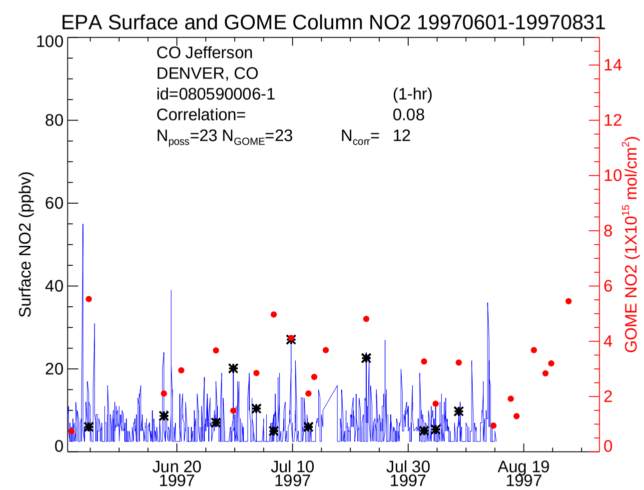


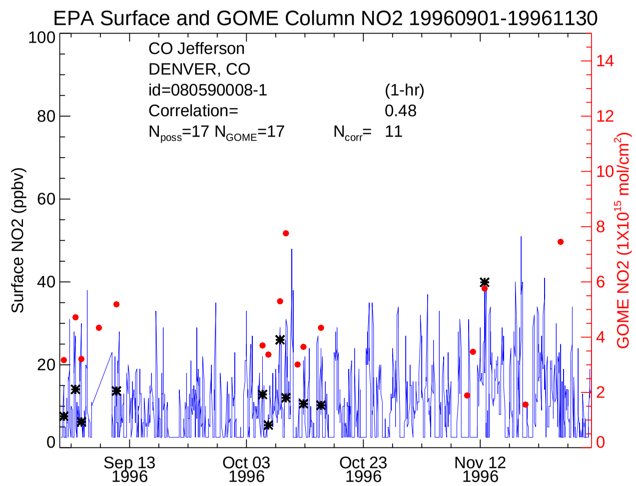
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



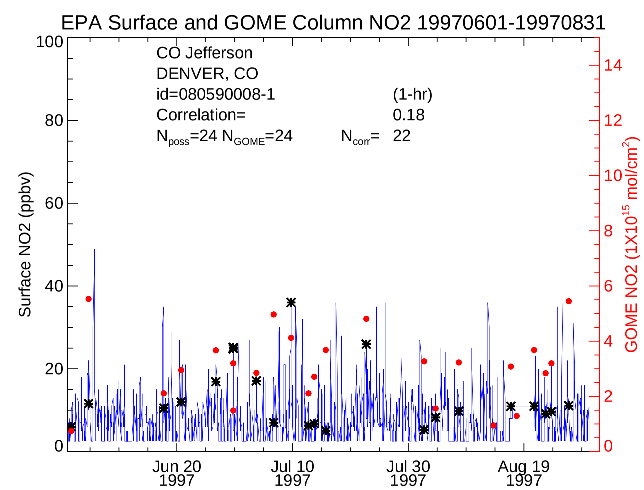


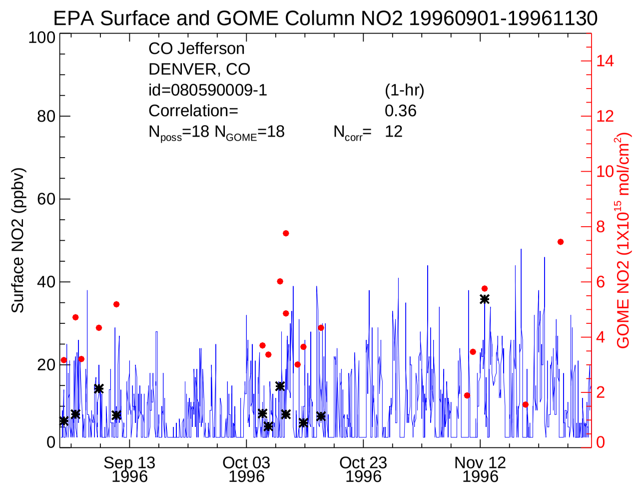
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



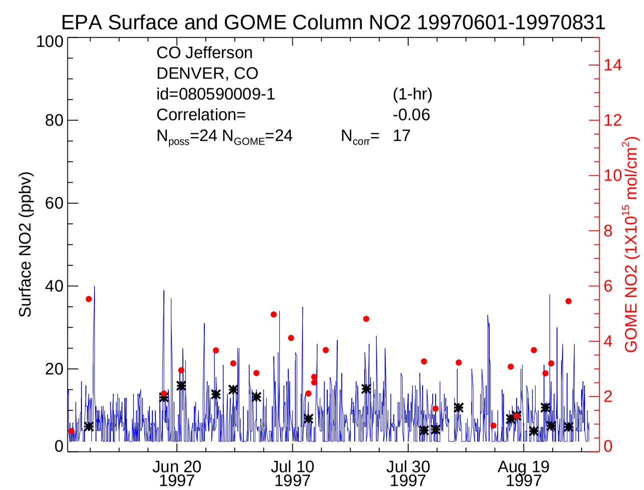


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



Insufficient Coincident Data

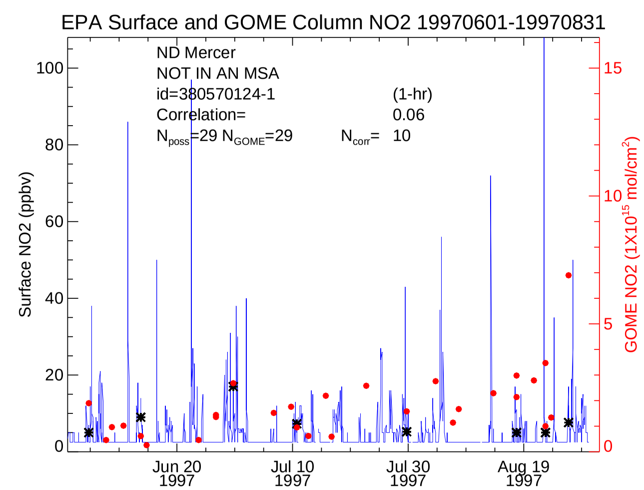
Fall (9/1/96-11/30/96)

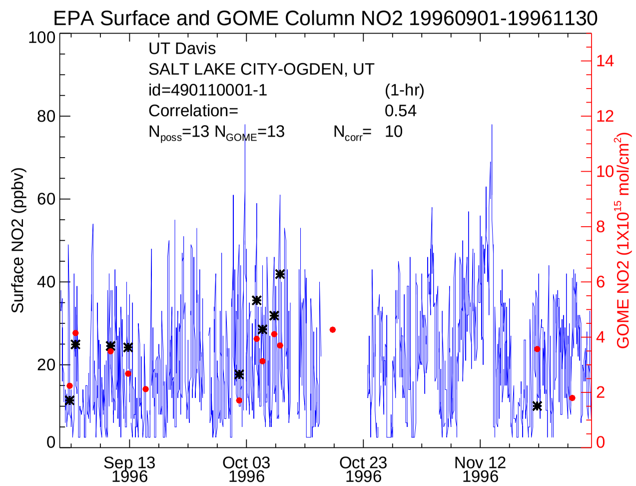
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



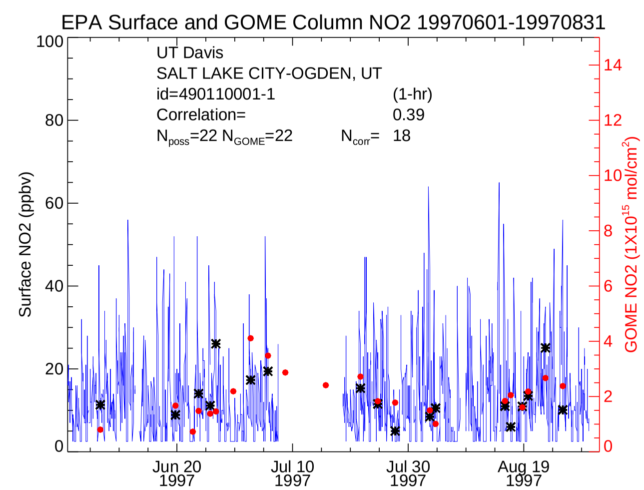


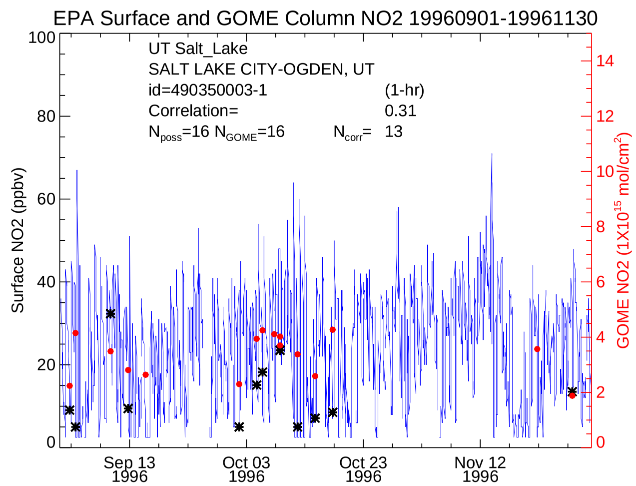
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



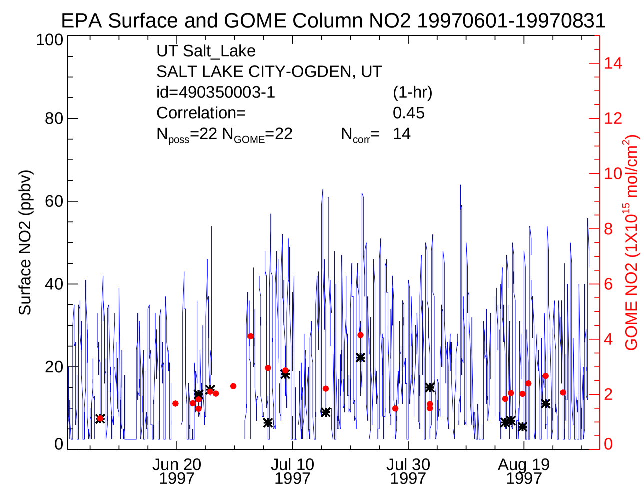


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



Insufficient Coincident Data

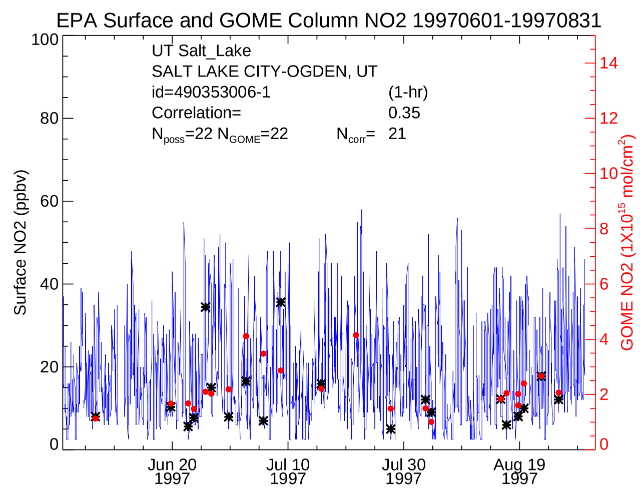
Fall (9/1/96-11/30/96)

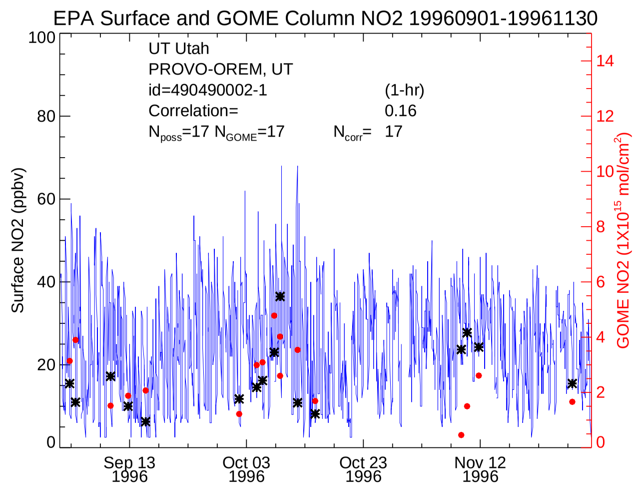
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



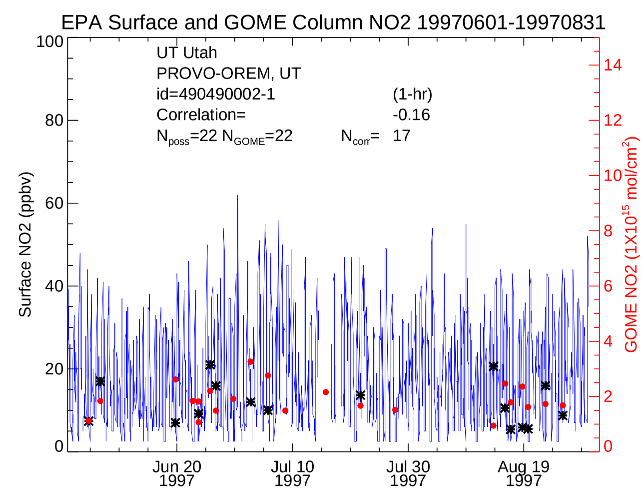


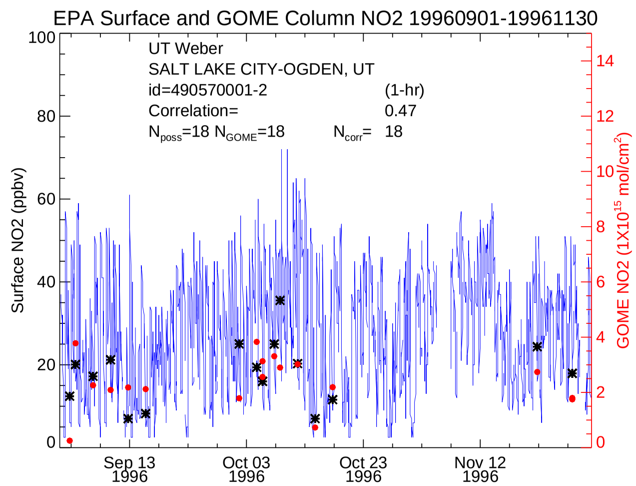
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



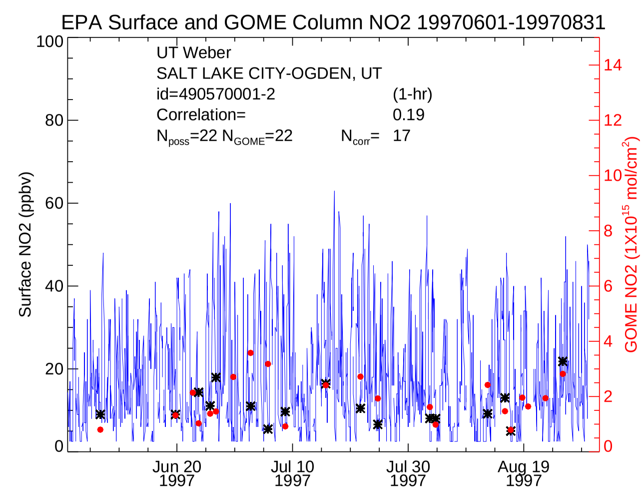


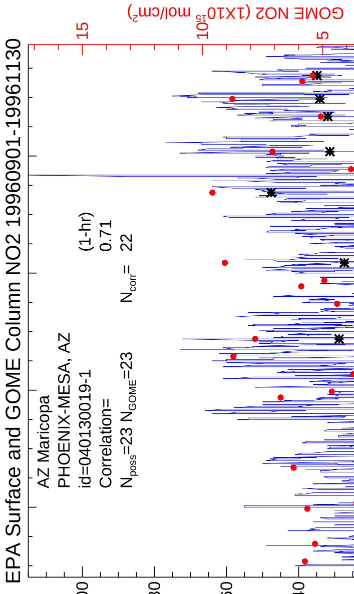
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

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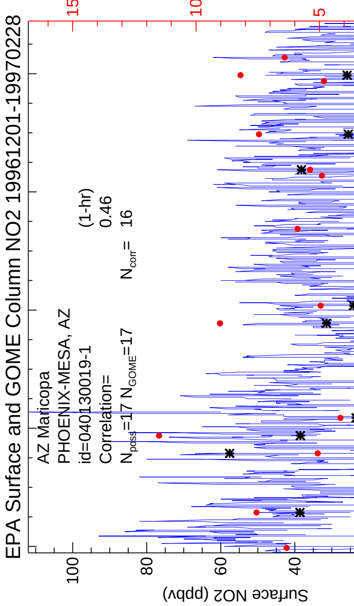
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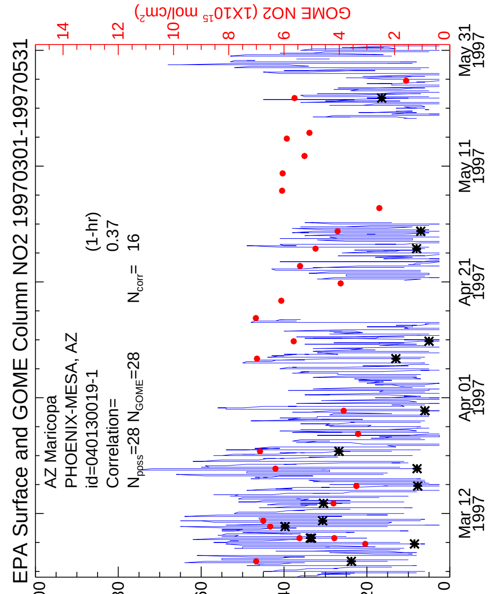
Feb 20 1997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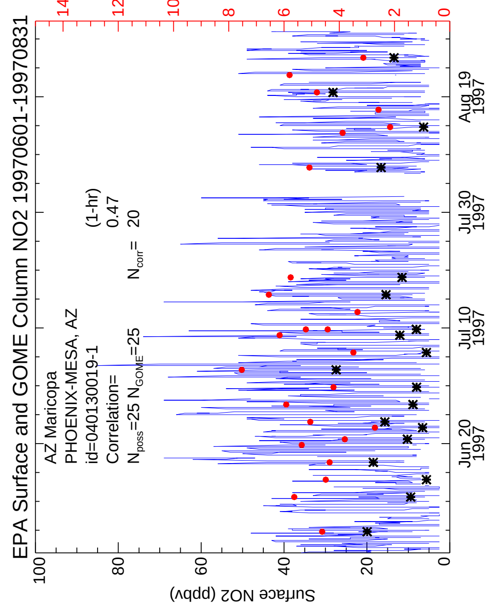
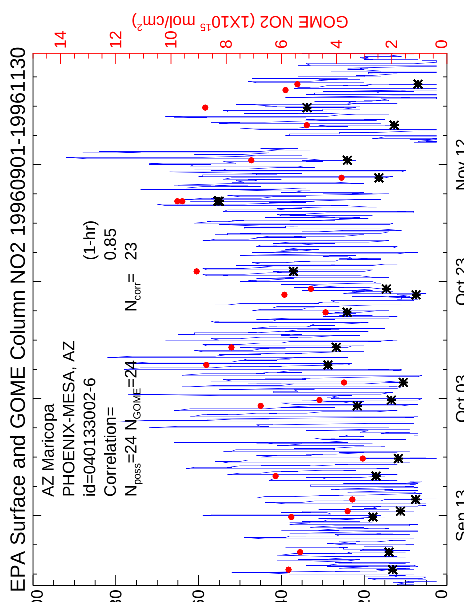
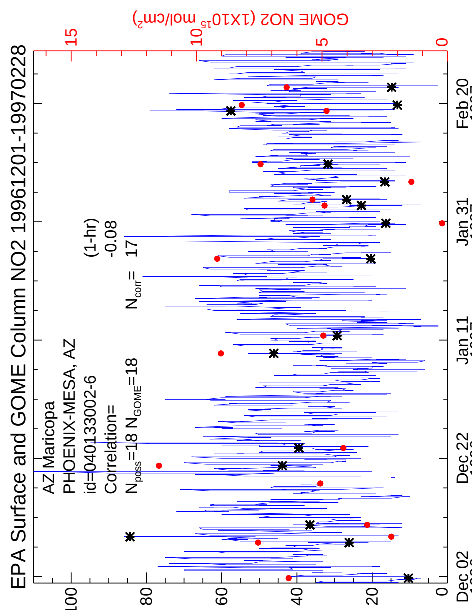
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997

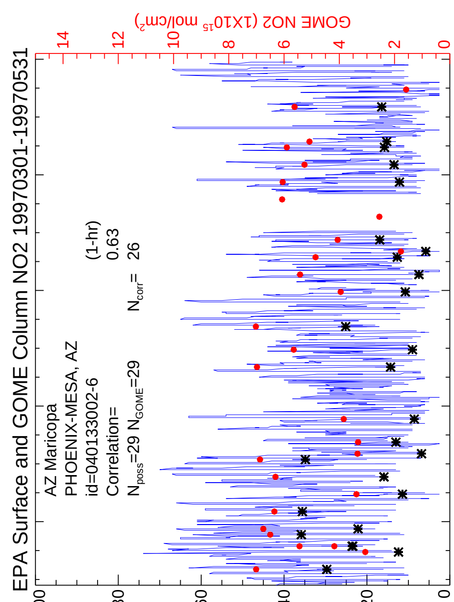

EPA Surface and GOME Column NO2 19970601-19970831
AZ Maricopa
PHOENIX-MESA, AZ
id=040130019-1
Correlation= (1-hr) 0.47
Nposs=25 NGOME=25 Ncorr= 20
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997



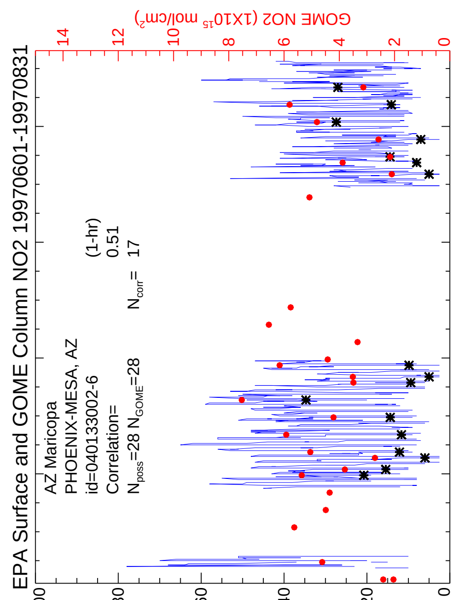
EPA Surface and GOME Column NO2 19960901-19961130
AZ Maricopa
PHOENIX-MESA, AZ
id=040133002-6
Correlation= (1-hr) 0.85
N_{poss}=24 N_{GOME}=24 N_{corr}= 23
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996



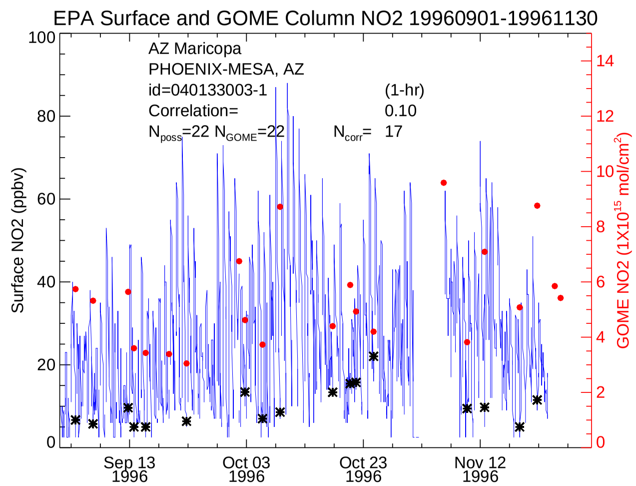
EPA Surface and GOME Column NO2 19961201-19970228
AZ Maricopa
PHOENIX-MESA, AZ
id=040133002-6
Correlation= (1-hr) -0.08
N_{poss}=18 N_{GOME}=18 N_{corr}= 17
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997



EPA Surface and GOME Column NO2 19970301-19970531
AZ Maricopa
PHOENIX-MESA, AZ
id=040133002-6
Correlation= (1-hr) 0.63
N_{poss}=29 N_{GOME}=29 N_{corr}= 26
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997



EPA Surface and GOME Column NO2 19970601-19970831
AZ Maricopa
PHOENIX-MESA, AZ
id=040133002-6
Correlation= (1-hr) 0.51
N_{poss}=28 N_{GOME}=28 N_{corr}= 17
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997



Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)

Insufficient Coincident Data

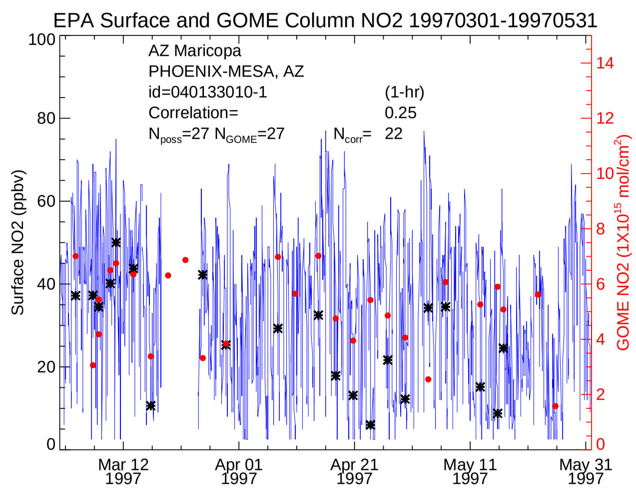
Summer (6/1/97-8/31/97)

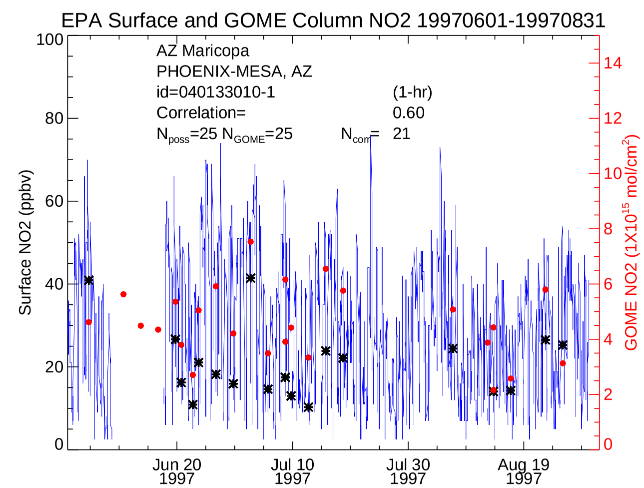
Insufficient Coincident Data

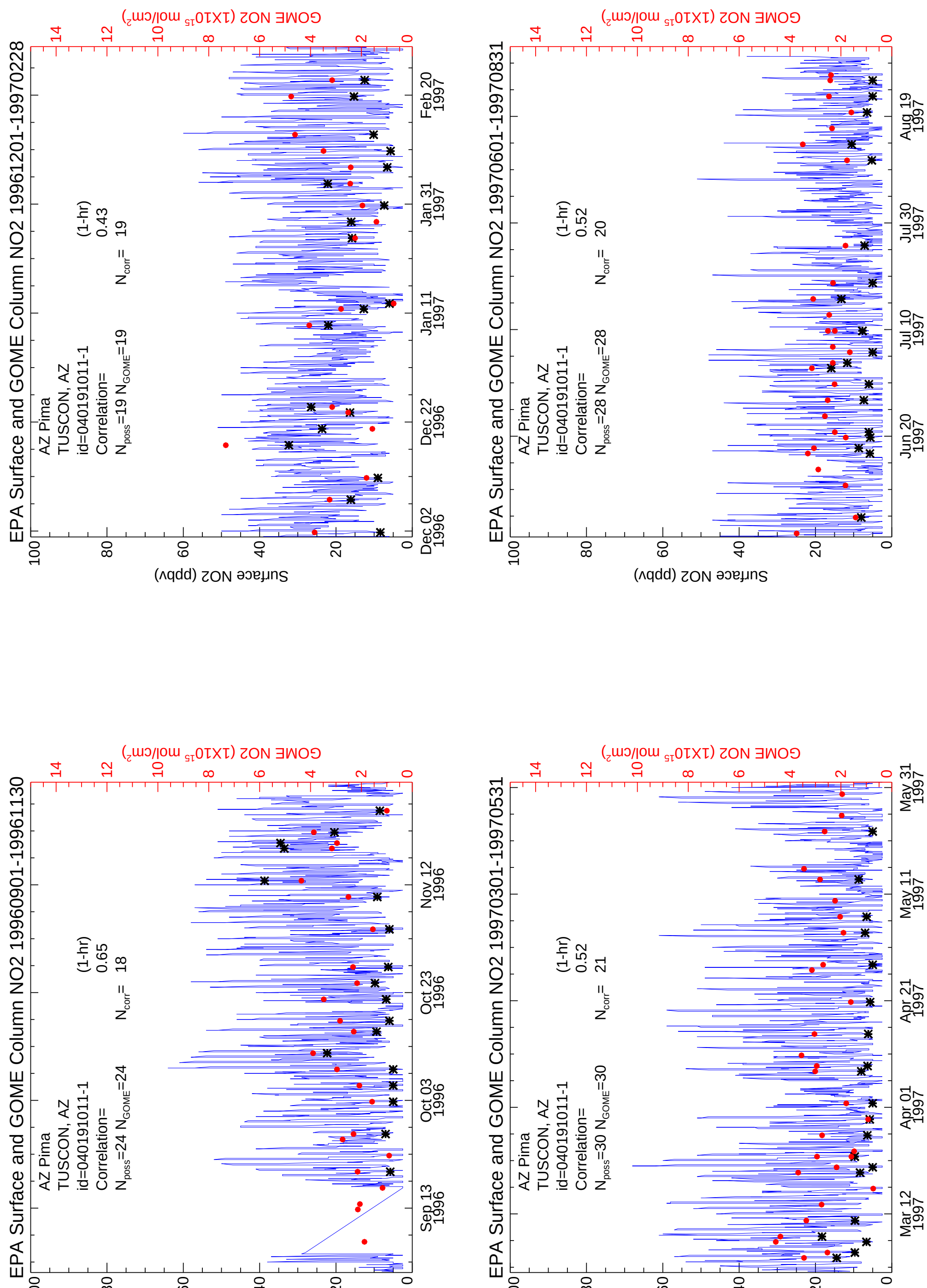
Fall (9/1/96-11/30/96)

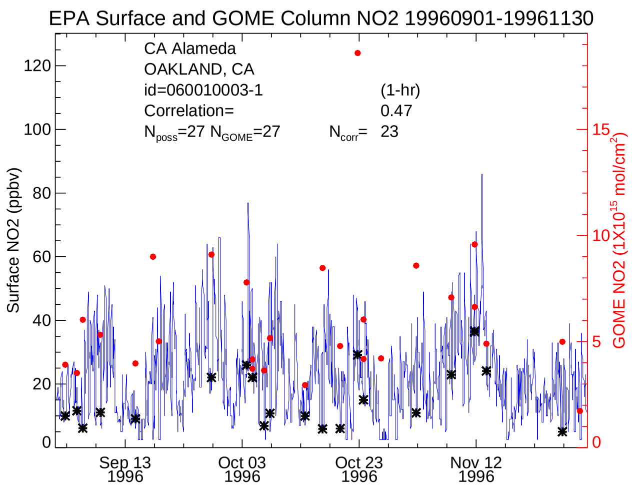
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



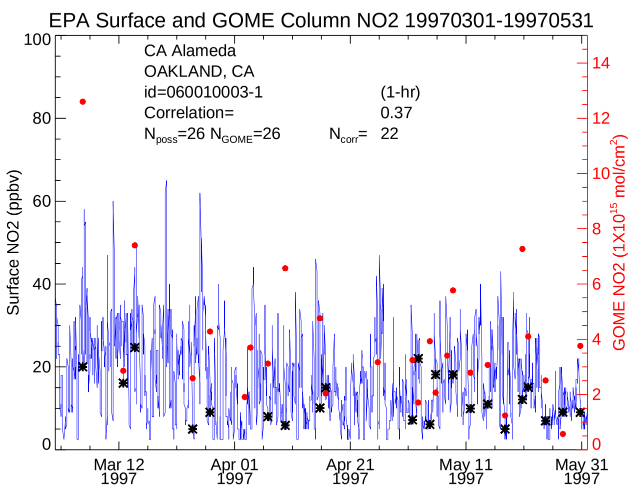


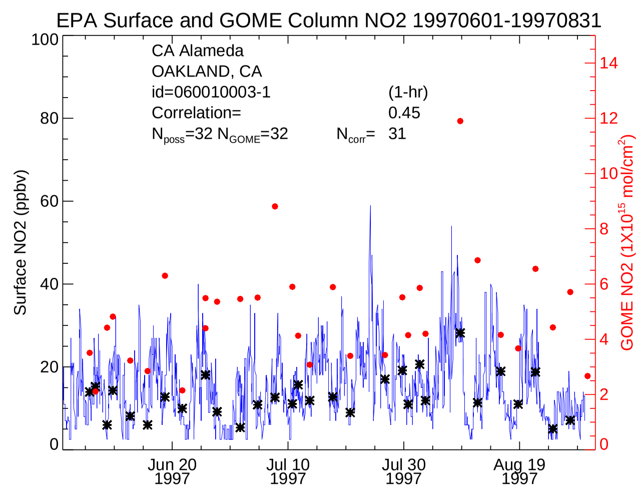

EPA Surface and GOME Column NO2 19960901-19961130
AZ Pima
TUSCON, AZ
id=040191011-1
Correlation= (1-hr) 0.65
Nposs=24 NGOME=24 Ncorr= 18
EPA Surface and GOME Column NO2 19961201-19970228
AZ Pima
TUSCON, AZ
id=040191011-1
Correlation= (1-hr) 0.43
Nposs=19 NGOME=19 Ncorr= 19
EPA Surface and GOME Column NO2 19970301-19970531
AZ Pima
TUSCON, AZ
id=040191011-1
Correlation= (1-hr) 0.52
Nposs=30 NGOME=30 Ncorr= 21
EPA Surface and GOME Column NO2 19970601-19970831
AZ Pima
TUSCON, AZ
id=040191011-1
Correlation= (1-hr) 0.52
Nposs=28 NGOME=28 Ncorr= 20
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

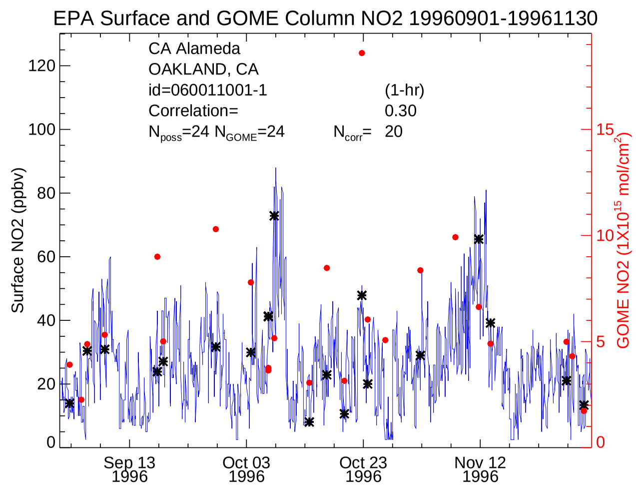


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

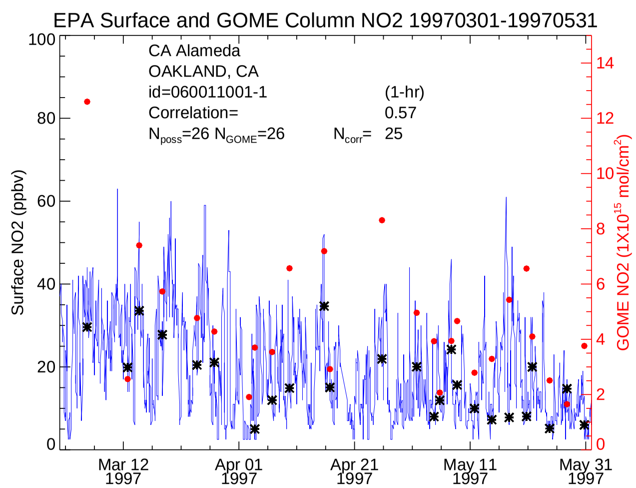


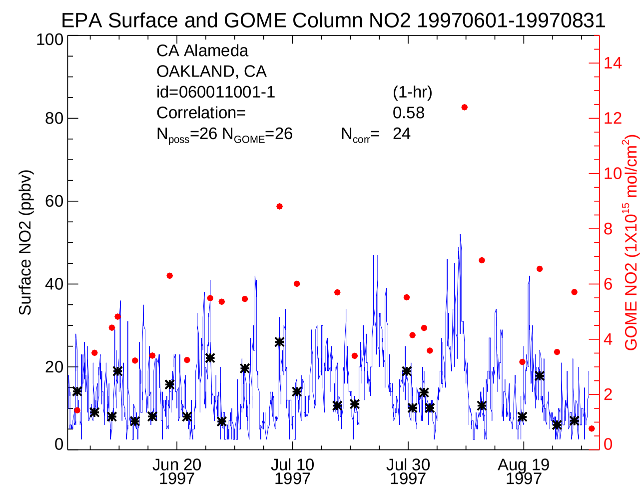


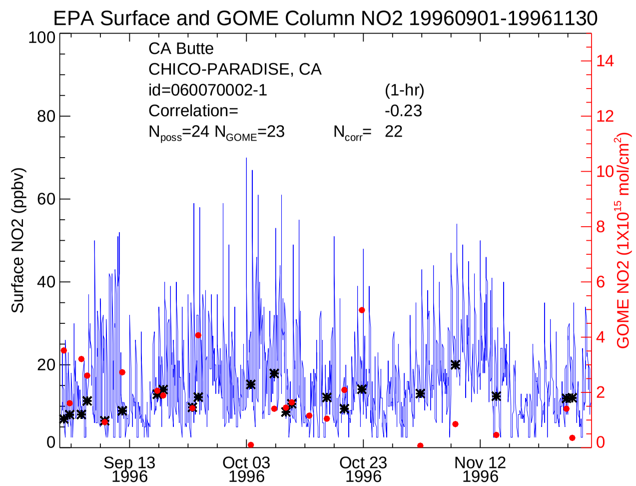


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

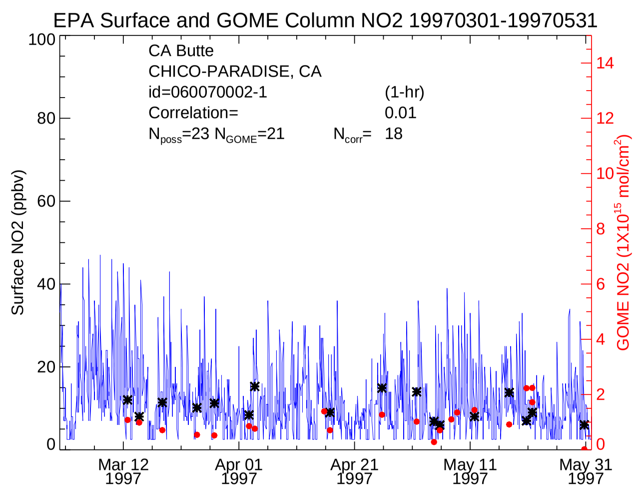


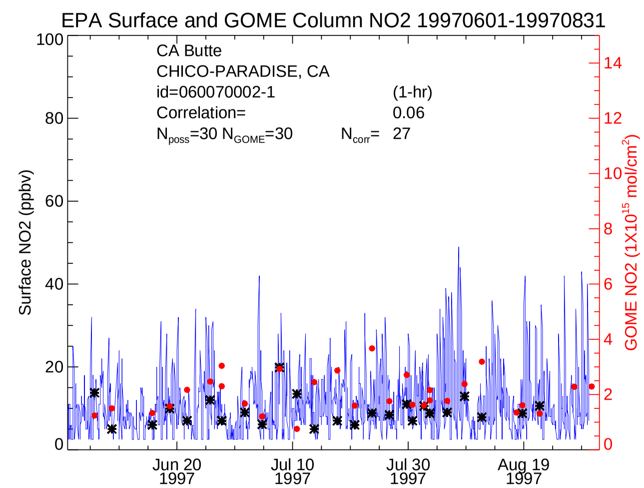


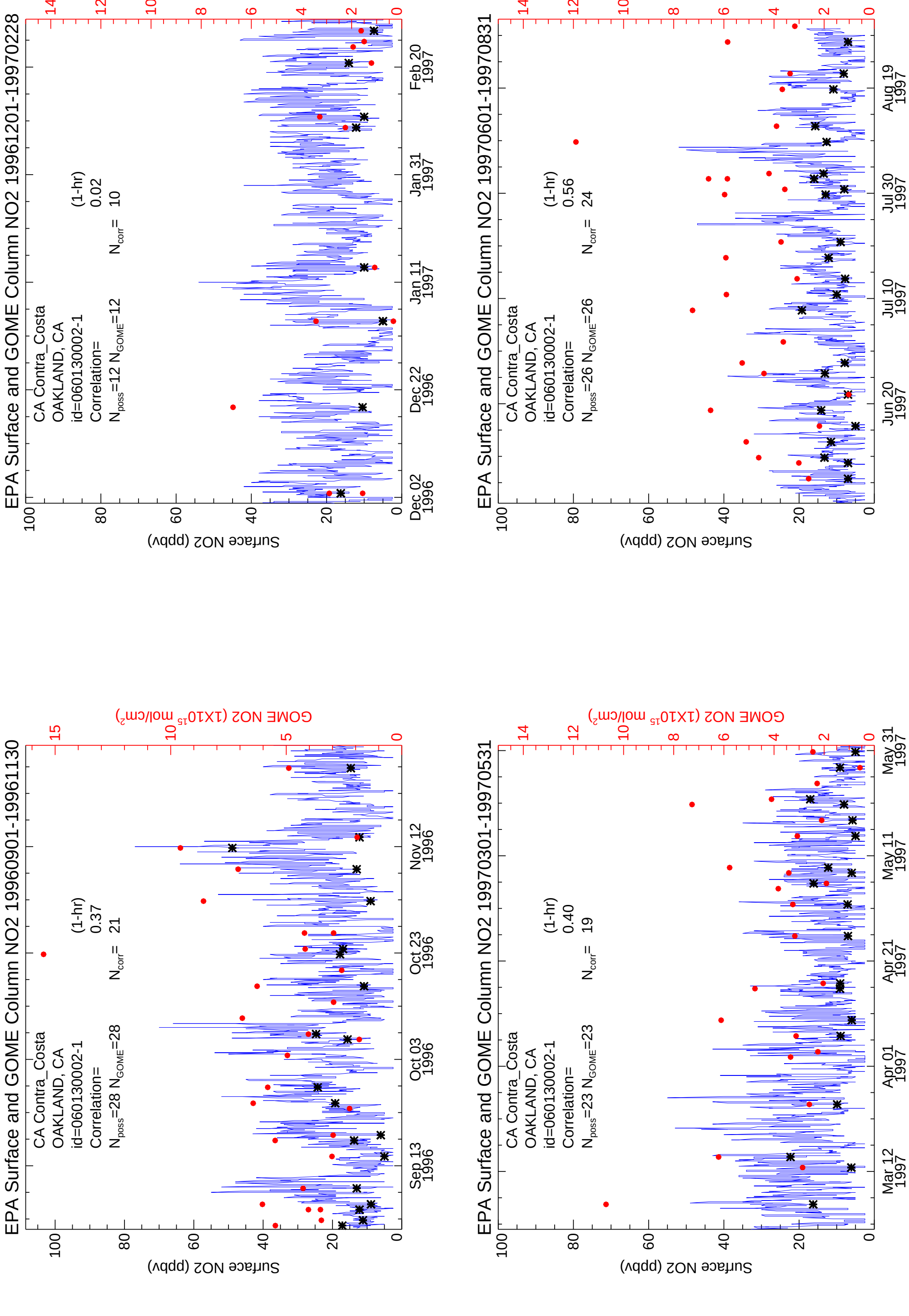


Insufficient Coincident Data

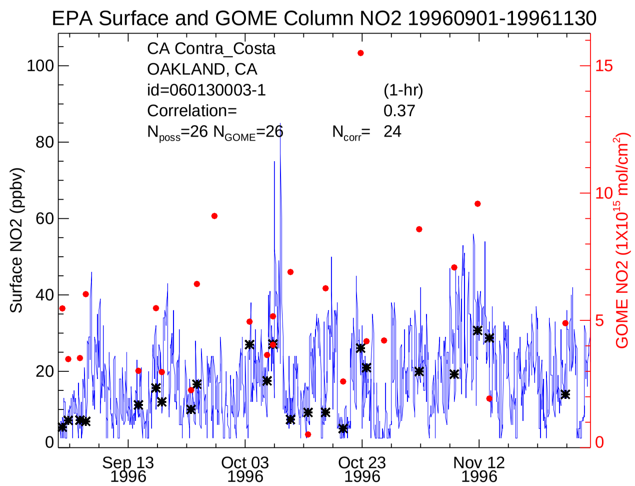
Winter (12/1/96-2/28/97)





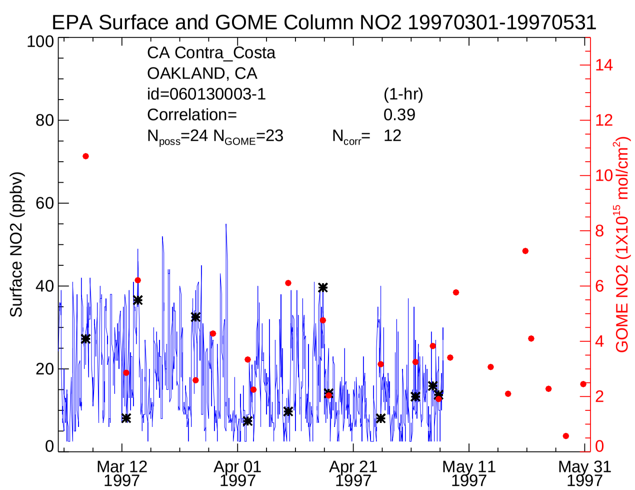


EPA Surface and GOME Column NO2 19961201-19970228
CA Contra_Costa
OAKLAND, CA
id=060130002-1
Correlation= (1-hr) 0.02
Nposs=12 NGOME=12 Ncorr= 10
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
EPA Surface and GOME Column NO2 19970601-19970831
CA Contra_Costa
OAKLAND, CA
id=060130002-1
Correlation= (1-hr) 0.56
Nposs=26 NGOME=26 Ncorr= 24
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997
EPA Surface and GOME Column NO2 19960901-19961130
CA Contra_Costa
OAKLAND, CA
id=060130002-1
Correlation= (1-hr) 0.37
Nposs=28 NGOME=28 Ncorr= 21
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
EPA Surface and GOME Column NO2 19970301-19970531
CA Contra_Costa
OAKLAND, CA
id=060130002-1
Correlation= (1-hr) 0.40
Nposs=23 NGOME=23 Ncorr= 19
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997



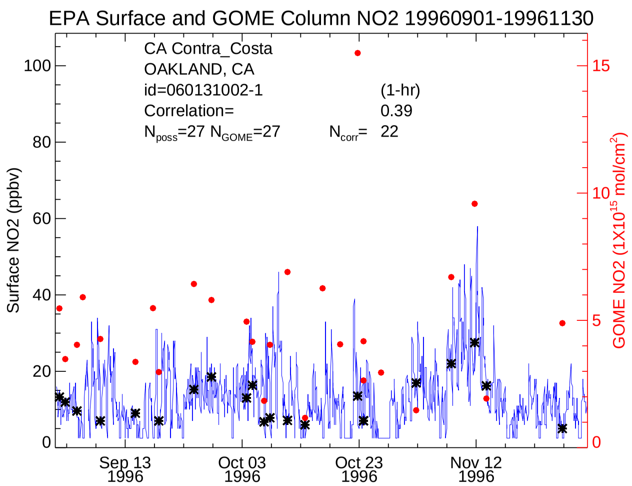
Insufficient Coincident Data

Winter (12/1/96-2/28/97)



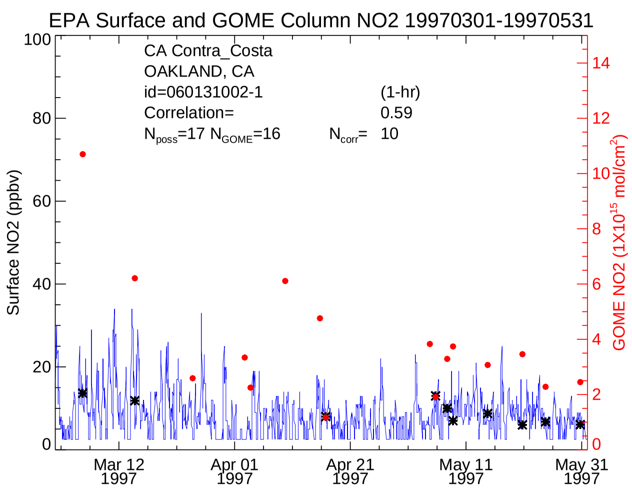
Insufficient Coincident Data

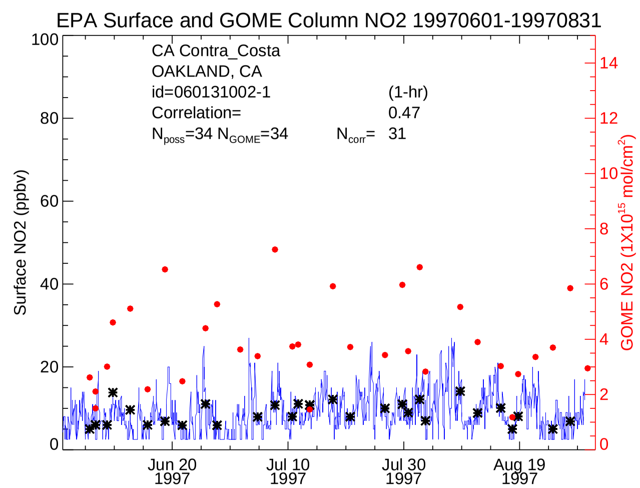
Summer (6/1/97-8/31/97)



Insufficient Coincident Data

Winter (12/1/96-2/28/97)





Insufficient Coincident Data

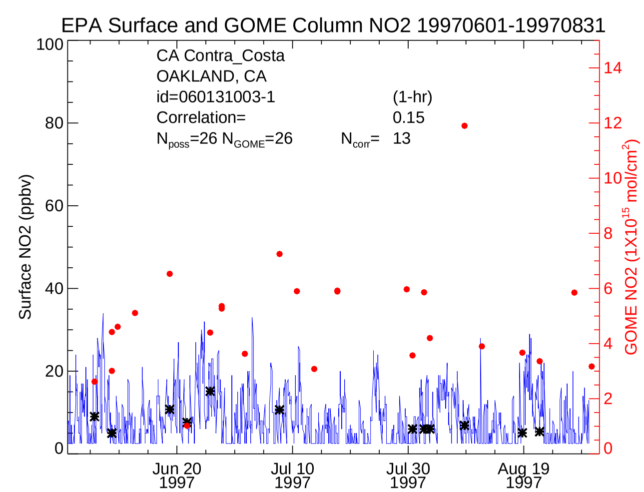
Fall (9/1/96-11/30/96)

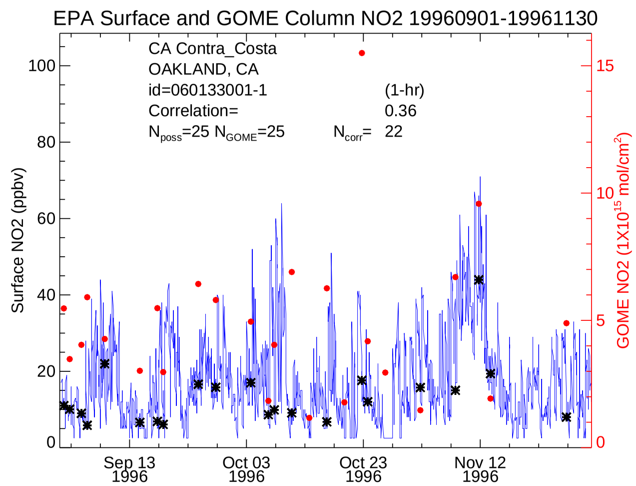
Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

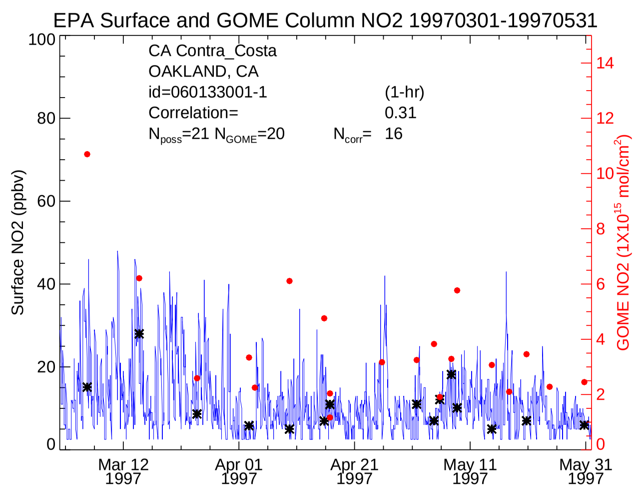
Spring (3/1/97-5/31/97)

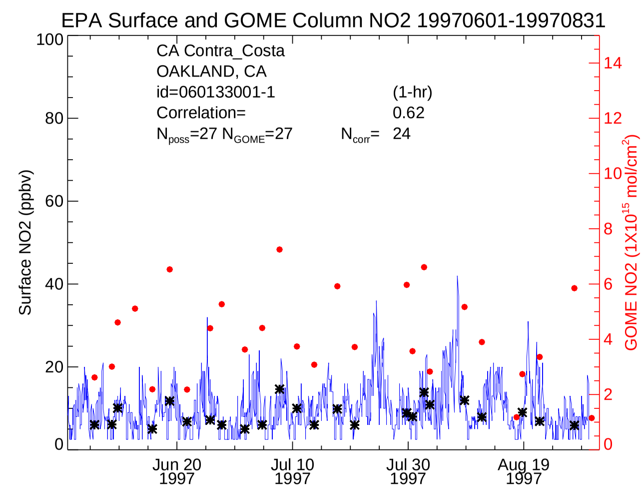


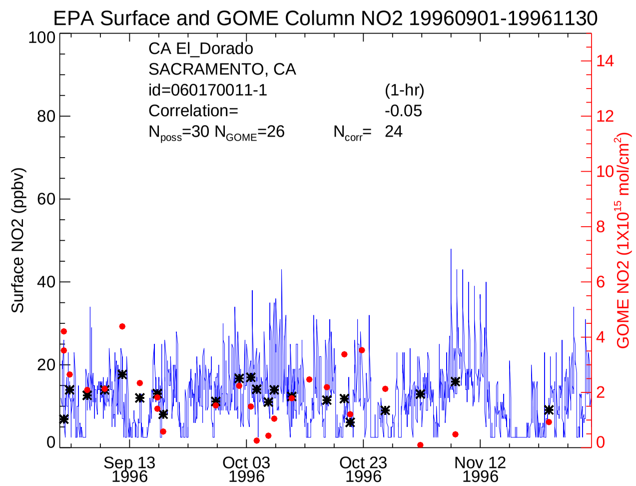


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

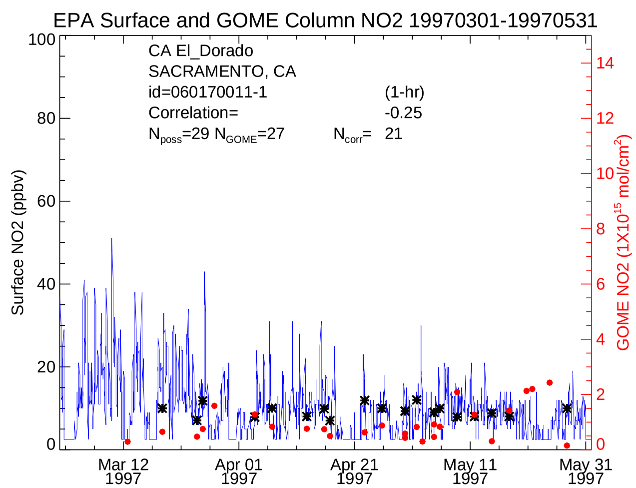


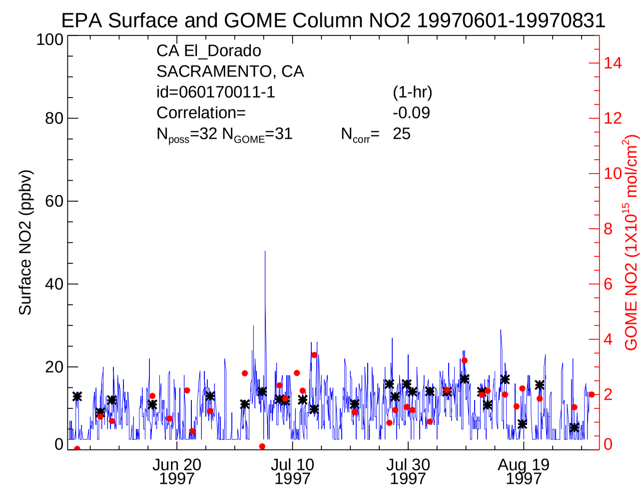


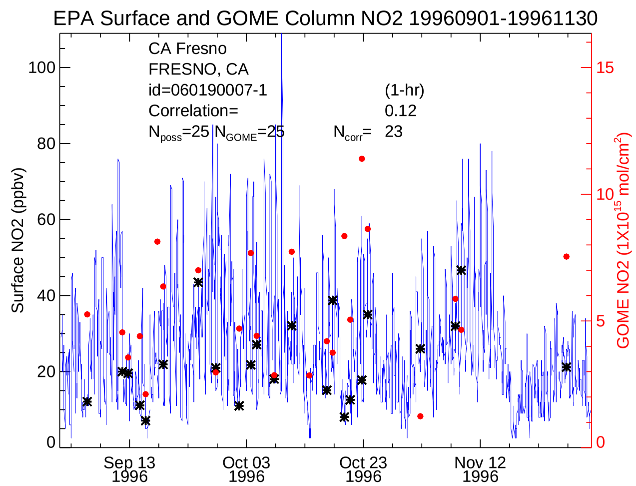


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

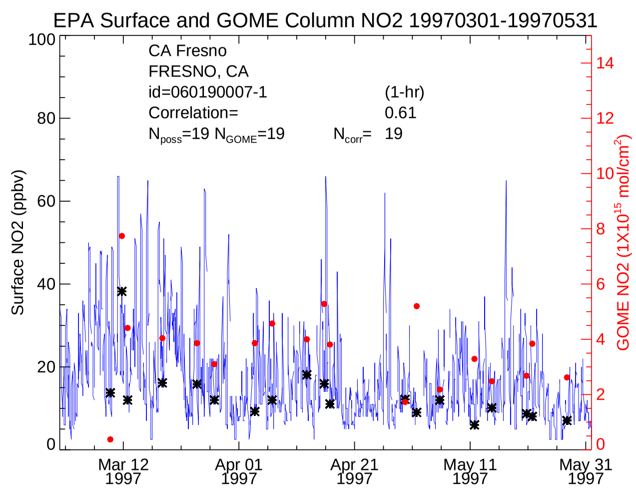


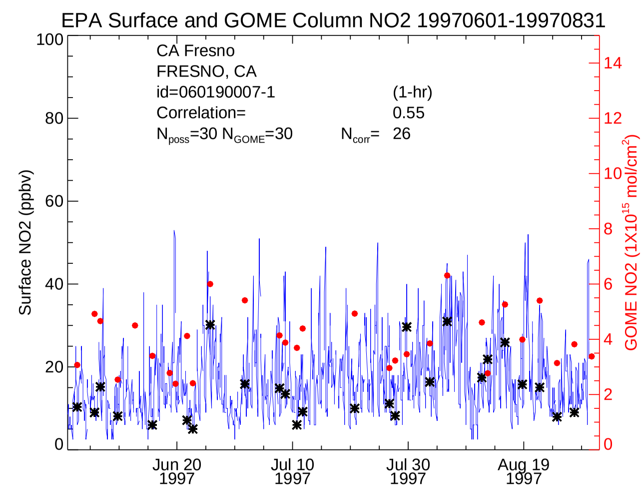


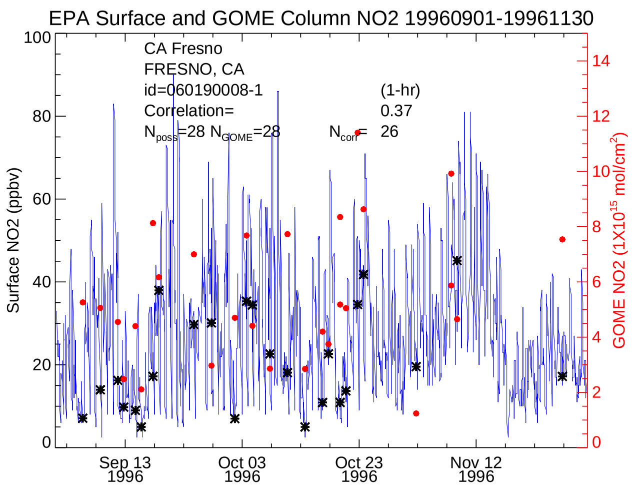


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

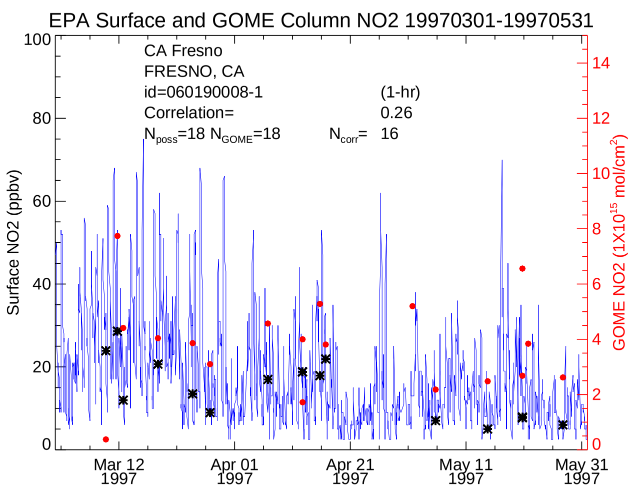


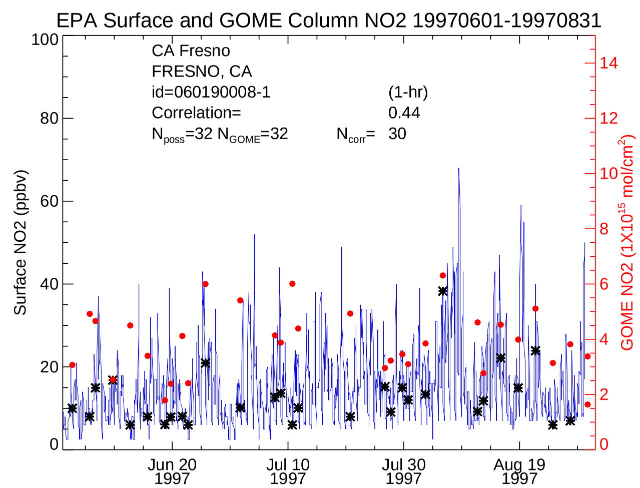


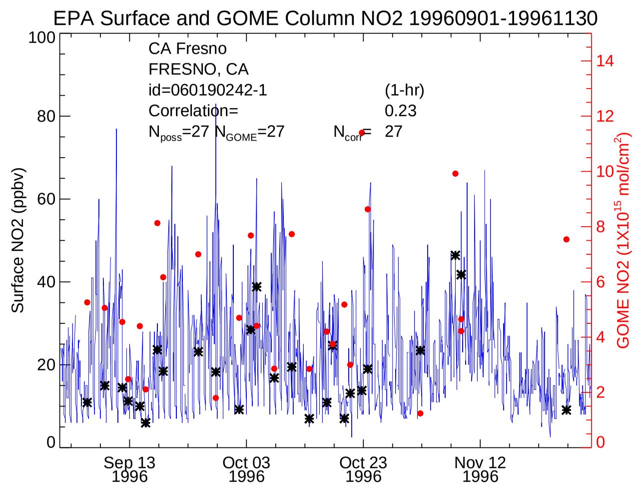


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

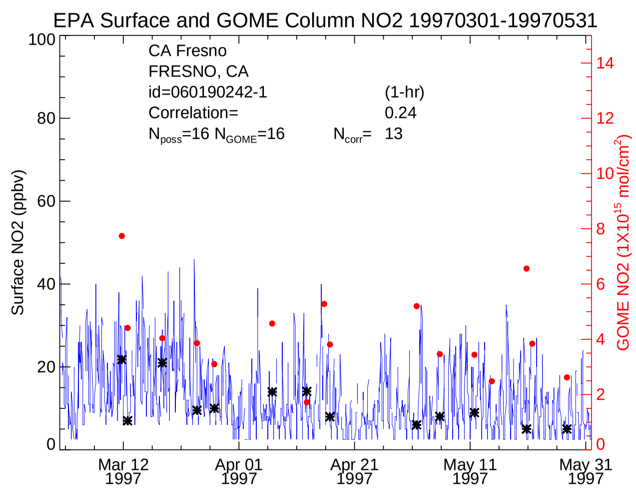


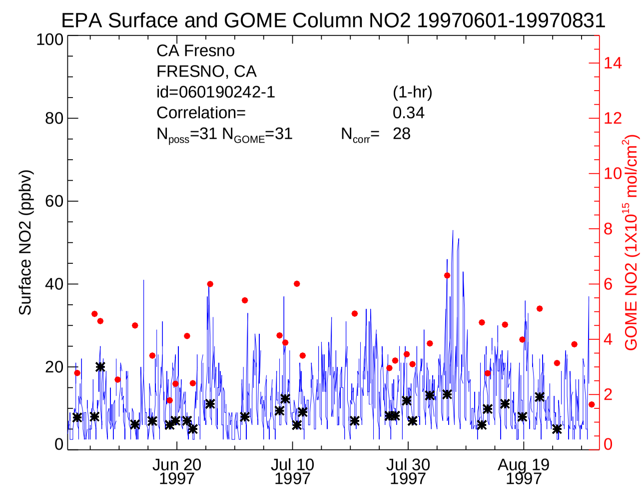


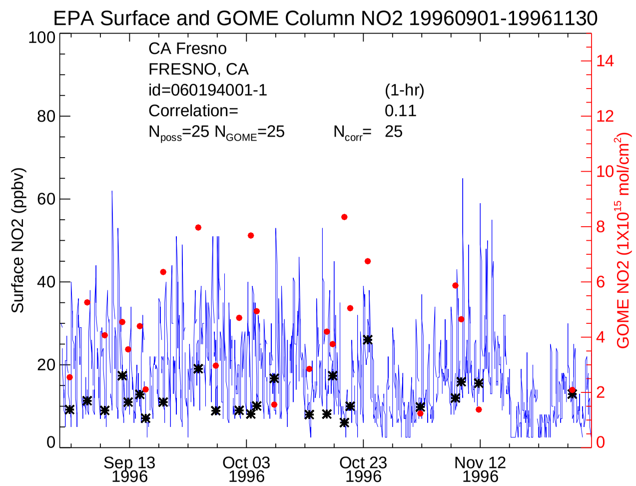


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

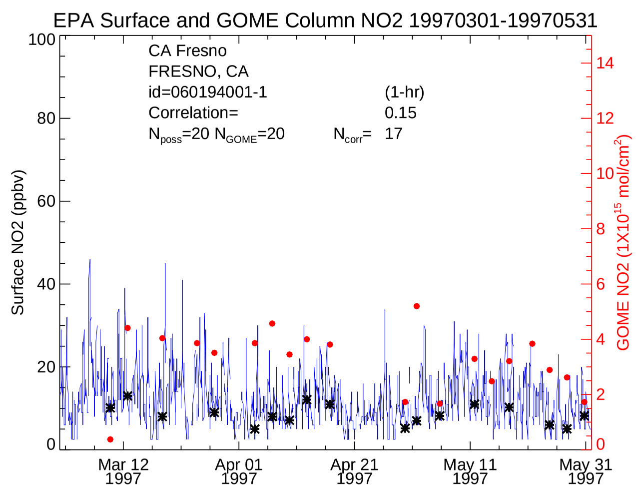


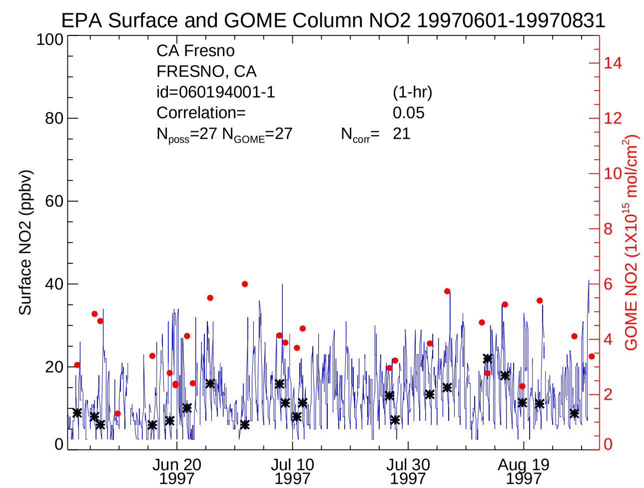


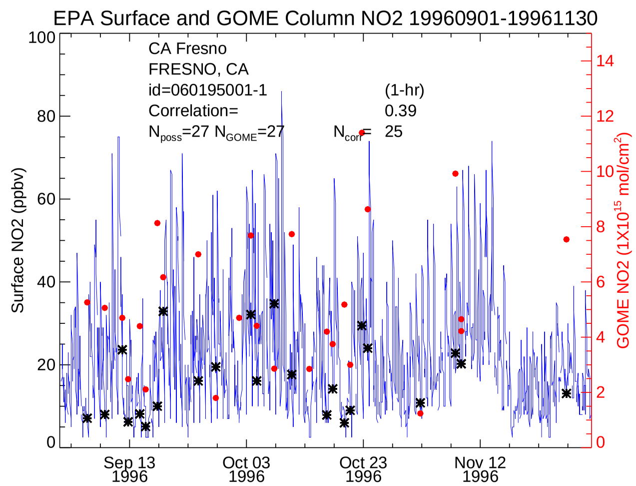


Insufficient Coincident Data

Winter (12/1/96-2/28/97)

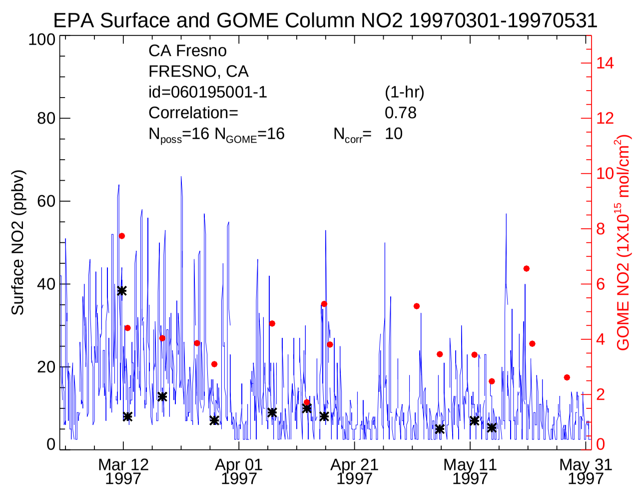


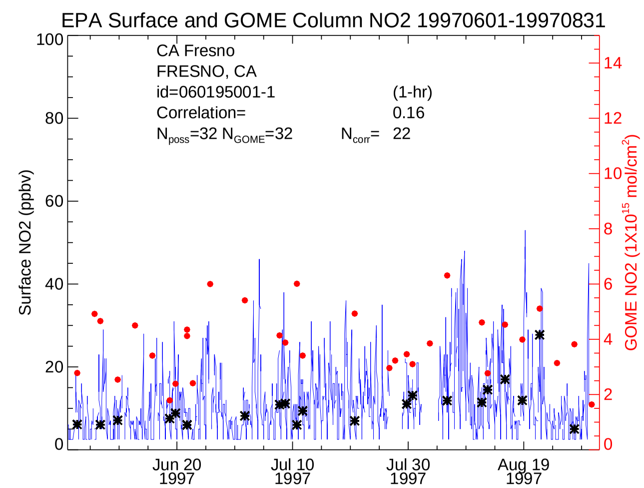


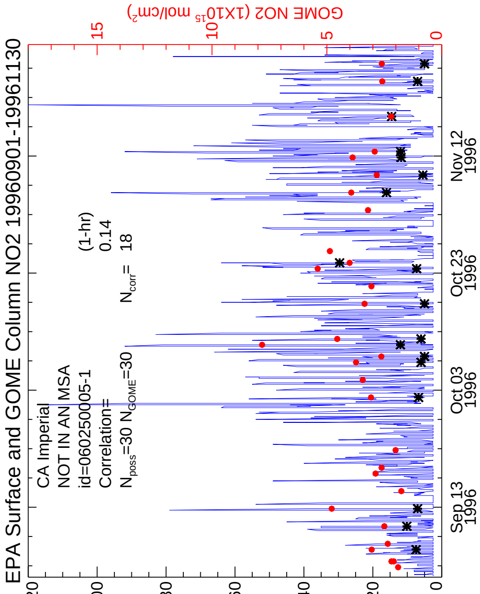


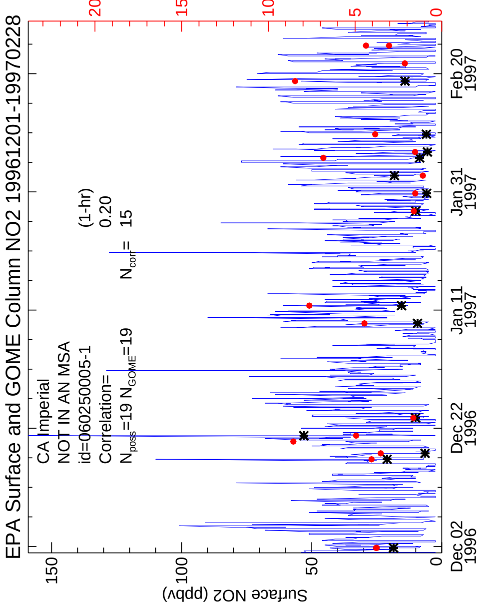
Insufficient Coincident Data

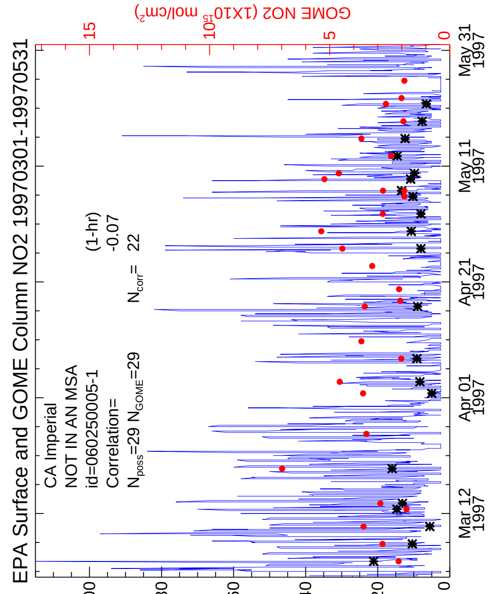
Winter (12/1/96-2/28/97)

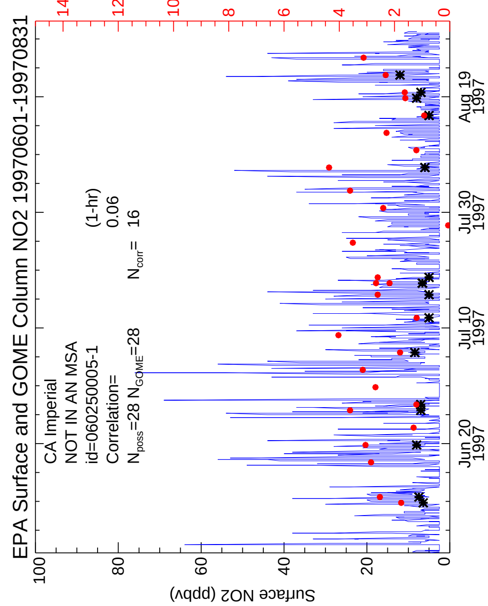





EPA Surface and GOME Column NO2 19960901-19961130
CA Imperial
NOT IN AN MSA
id=060250005-1
Correlation= (1-hr) 0.14
Nposs=30 NGOME=30 Ncorr= 18
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996


EPA Surface and GOME Column NO2 19961201-19970228
CA Imperial
NOT IN AN MSA
id=060250005-1
Correlation= (1-hr) 0.20
Nposs=19 NGOME=19 Ncorr= 15
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997

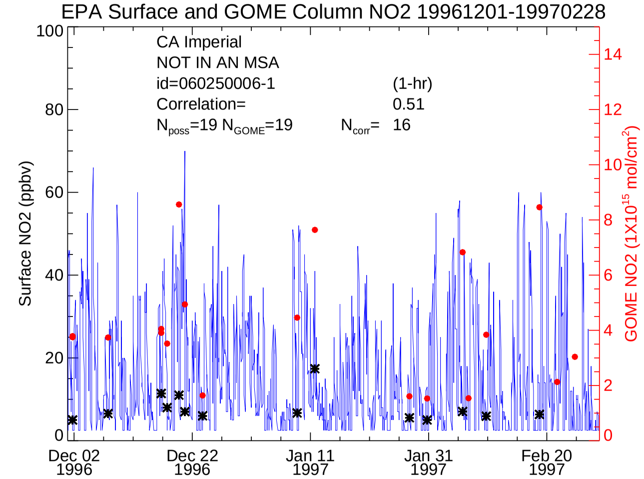

EPA Surface and GOME Column NO2 19970301-19970531
CA Imperial
NOT IN AN MSA
id=060250005-1
Correlation= (1-hr) -0.07
Nposs=29 NGOME=29 Ncorr= 22
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997


EPA Surface and GOME Column NO2 19970601-19970831
CA Imperial
NOT IN AN MSA
id=060250005-1
Correlation= (1-hr) 0.06
Nposs=28 NGOME=28 Ncorr= 16
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

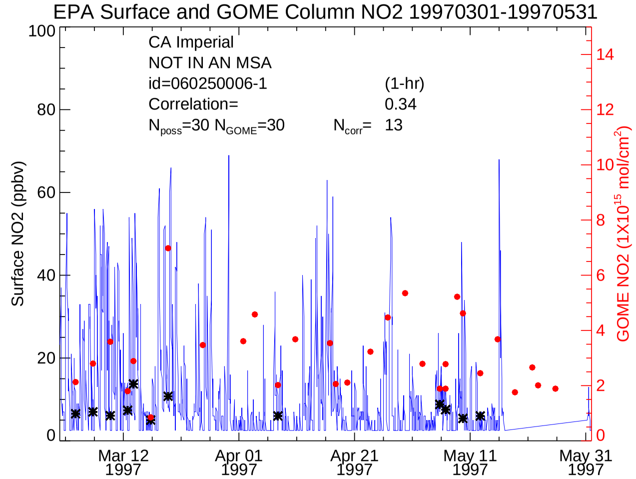
Insufficient Coincident Data

Fall (9/1/96-11/30/96)

EPA Surface and GOME Column NO2 19961201-19970228

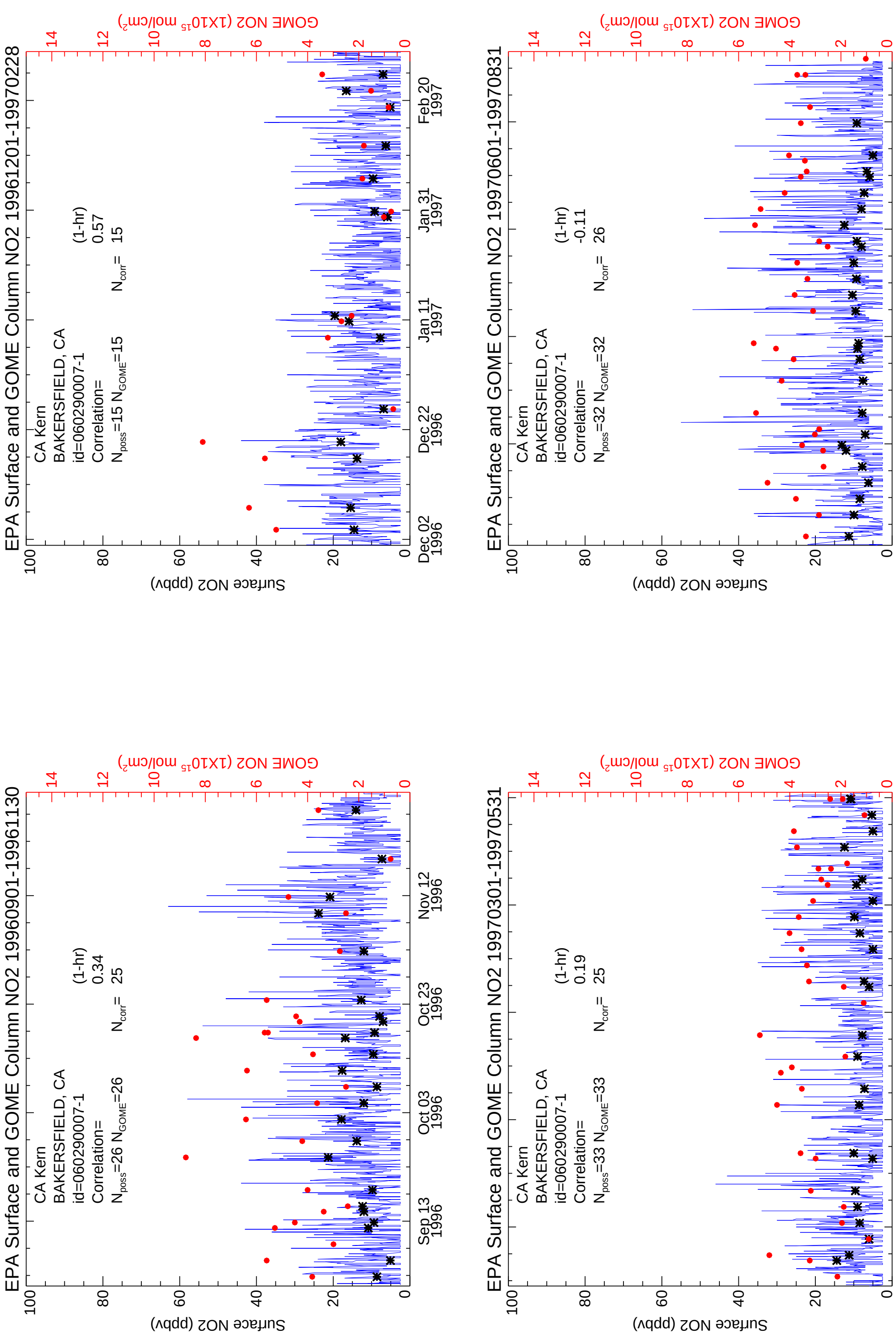


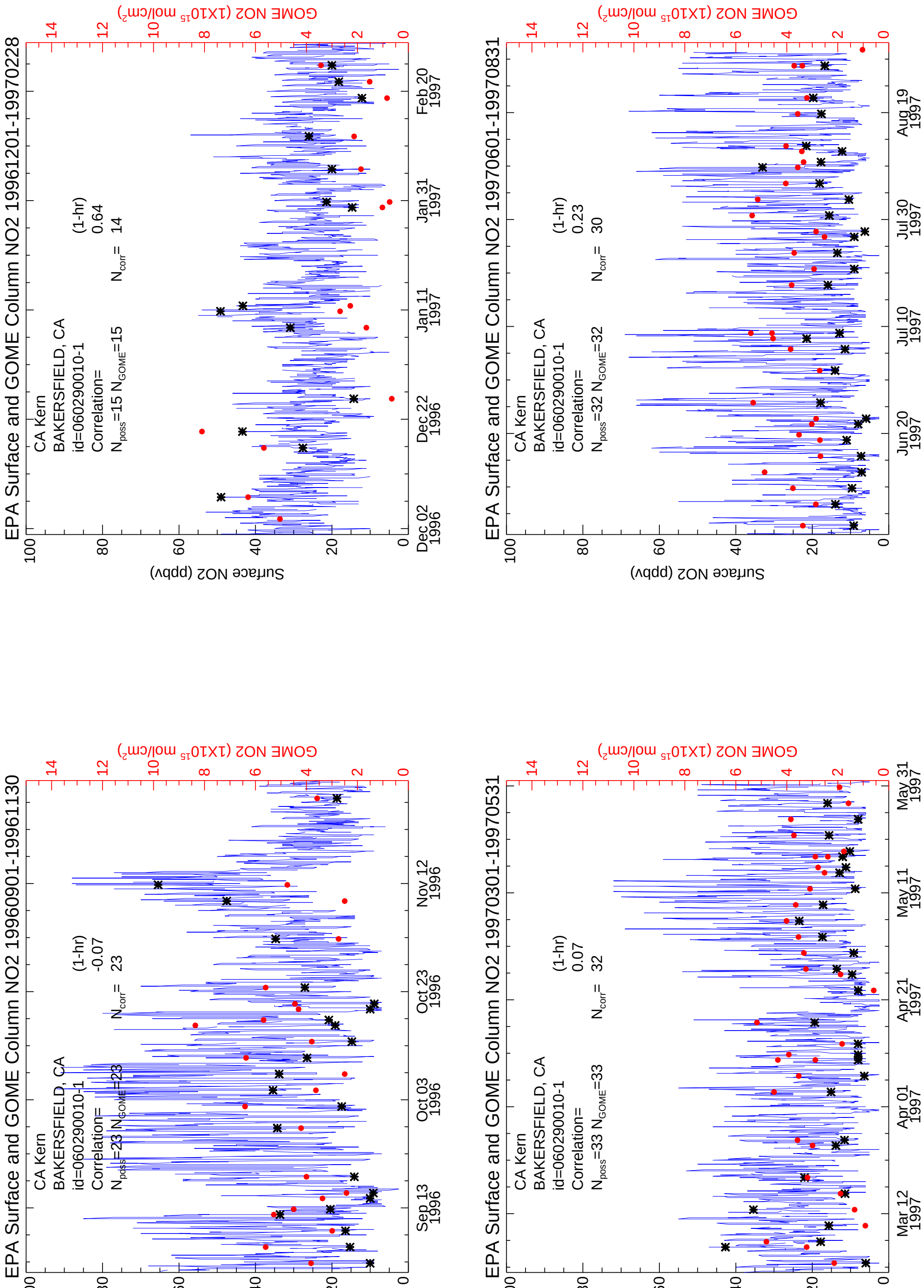
EPA Surface and GOME Column NO2 19970301-19970531



Insufficient Coincident Data

Summer (6/1/97-8/31/97)


EPA Surface and GOME Column NO2 19960901-19961130
CA Kern
BAKERSFIELD, CA
id=060290007-1
Correlation= (1-hr) 0.34
N_{poss}=26 N_{GOME}=26
N_{corr}= 25
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
EPA Surface and GOME Column NO2 19961201-19970228
CA Kern
BAKERSFIELD, CA
id=060290007-1
Correlation= (1-hr) 0.57
N_{poss}=15 N_{GOME}=15
N_{corr}= 15
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
EPA Surface and GOME Column NO2 19970301-19970531
CA Kern
BAKERSFIELD, CA
id=060290007-1
Correlation= (1-hr) 0.19
N_{poss}=33 N_{GOME}=33
N_{corr}= 25
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
EPA Surface and GOME Column NO2 19970601-19970831
CA Kern
BAKERSFIELD, CA
id=060290007-1
Correlation= (1-hr) -0.11
N_{poss}=32 N_{GOME}=32
N_{corr}= 26
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)



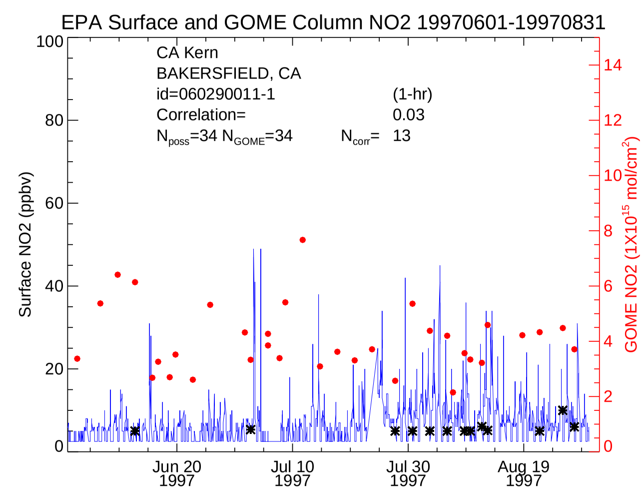
EPA Surface and GOME Column NO2 19960901-19961130
CA Kern
BAKERSFIELD, CA
id=060290010-1
Correlation= (1-hr) -0.07
N_poss=23 N_GOME=23 N_corr= 23
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
EPA Surface and GOME Column NO2 19961201-19970228
CA Kern
BAKERSFIELD, CA
id=060290010-1
Correlation= (1-hr) 0.64
N_poss=15 N_GOME=15 N_corr= 14
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
EPA Surface and GOME Column NO2 19970301-19970531
CA Kern
BAKERSFIELD, CA
id=060290010-1
Correlation= (1-hr) 0.07
N_poss=33 N_GOME=33 N_corr= 32
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
EPA Surface and GOME Column NO2 19970601-19970831
CA Kern
BAKERSFIELD, CA
id=060290010-1
Correlation= (1-hr) 0.23
N_poss=32 N_GOME=32 N_corr= 30
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

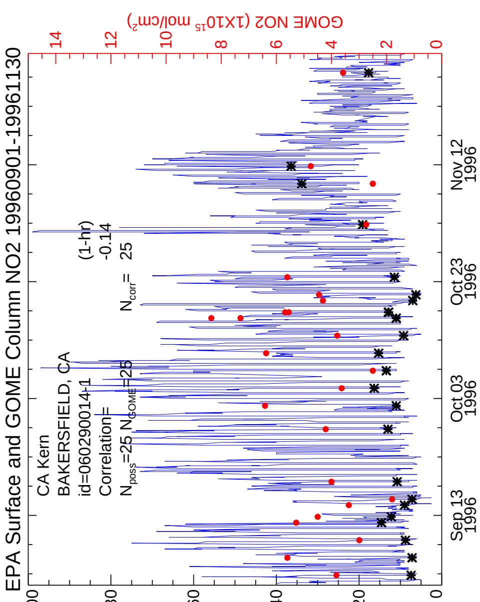
Insufficient Coincident Data

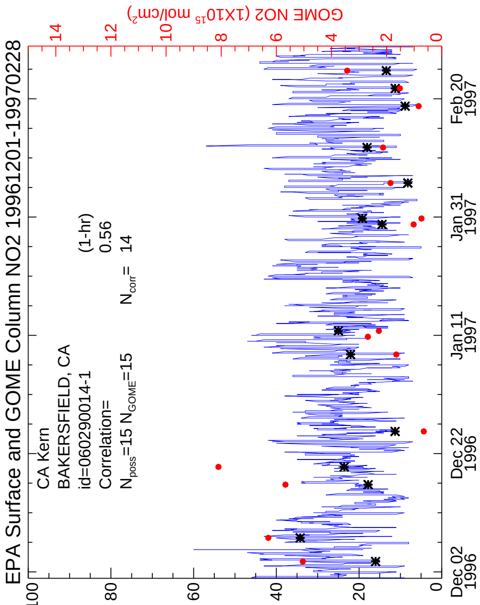
Fall (9/1/96-11/30/96)

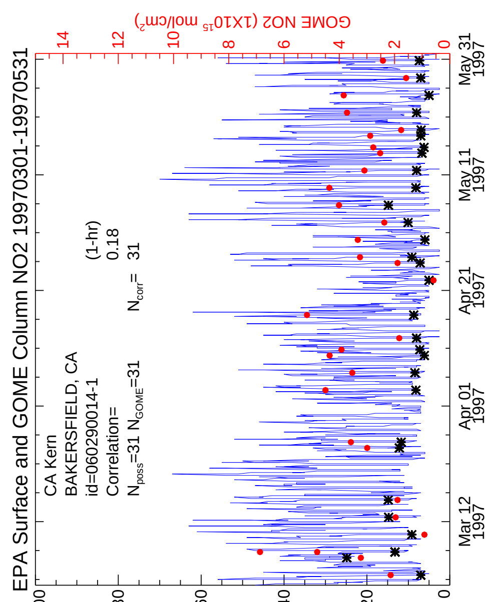


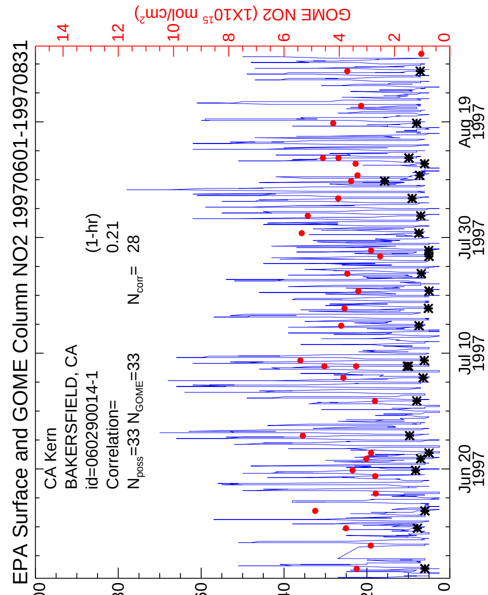
Insufficient Coincident Data

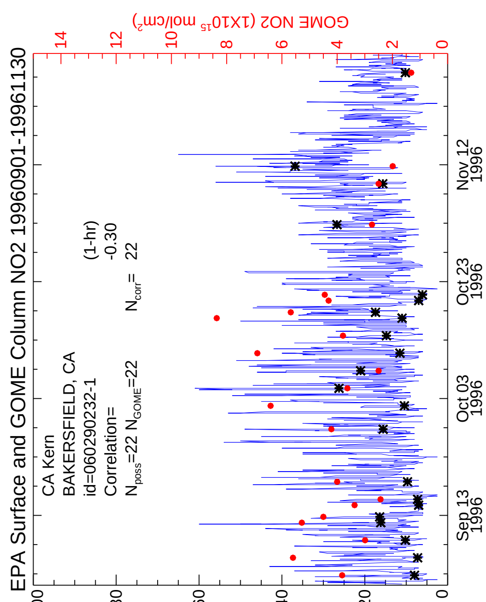
Spring (3/1/97-5/31/97)

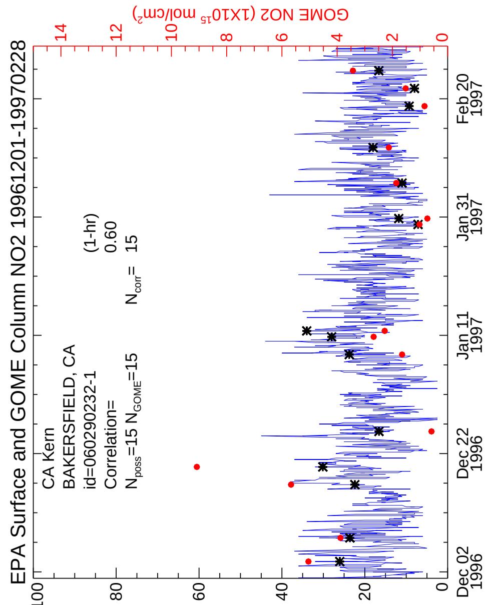

EPA Surface and GOME Column NO2 19960901-19961130
CA Kern
BAKERSFIELD, CA
id=060290014-1
Correlation= (1-hr) -0.14
N_{poss}=25 N_{GOME}=25
N_{corr}= 25
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996

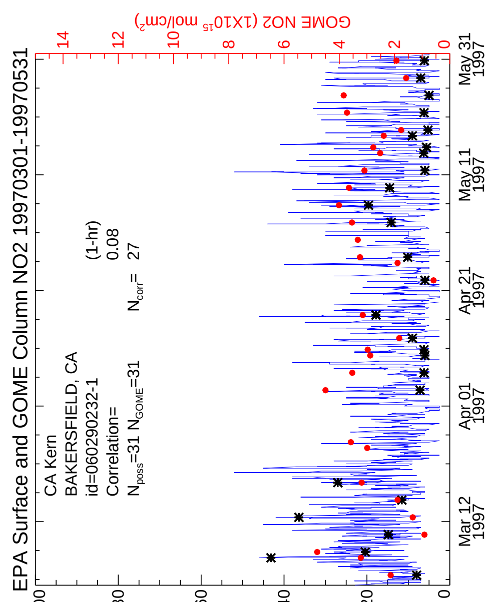

EPA Surface and GOME Column NO2 19961201-19970228
CA Kern
BAKERSFIELD, CA
id=060290014-1
Correlation= (1-hr) 0.56
N_{poss}=15 N_{GOME}=15
N_{corr}= 14
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997

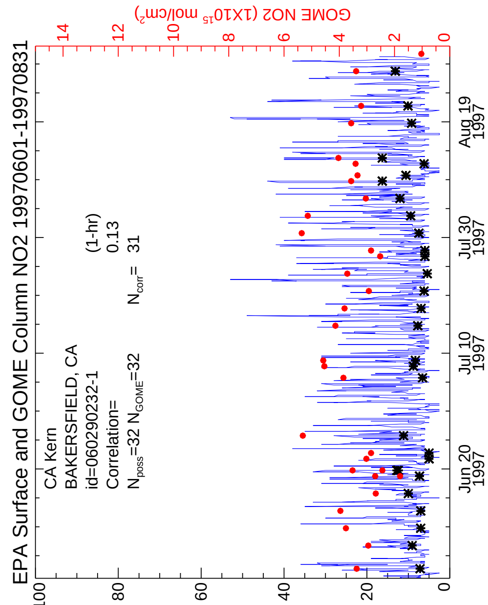

EPA Surface and GOME Column NO2 19970301-19970531
CA Kern
BAKERSFIELD, CA
id=060290014-1
Correlation= (1-hr) 0.18
N_{poss}=31 N_{GOME}=31
N_{corr}= 31
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997

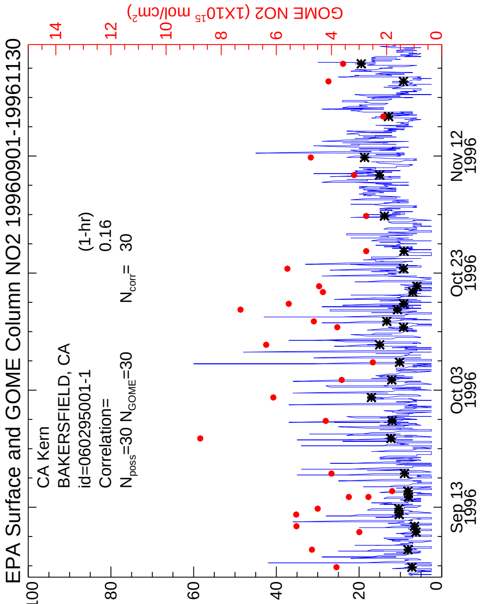

EPA Surface and GOME Column NO2 19970601-19970831
CA Kern
BAKERSFIELD, CA
id=060290014-1
Correlation= (1-hr) 0.21
N_{poss}=33 N_{GOME}=33
N_{corr}= 28
Surface NO2 (ppbv)
GOME NO2 (1X10^{15} mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

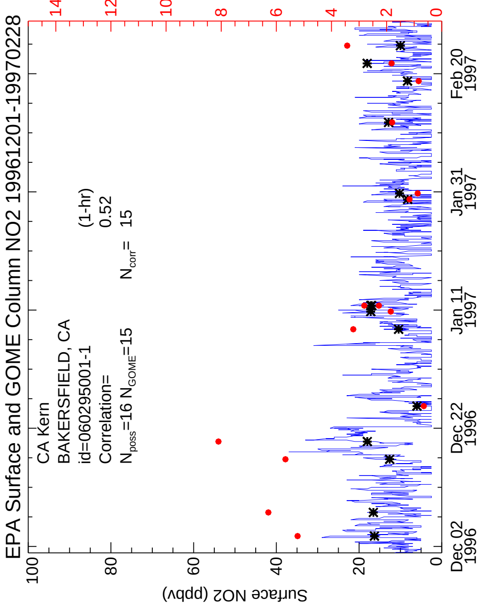

EPA Surface and GOME Column NO2 19960901-19961130
CA Kern
BAKERSFIELD, CA
id=060290232-1
Correlation= (1-hr) -0.30
N_poss=22 N_GOME=22 N_corr= 22
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996

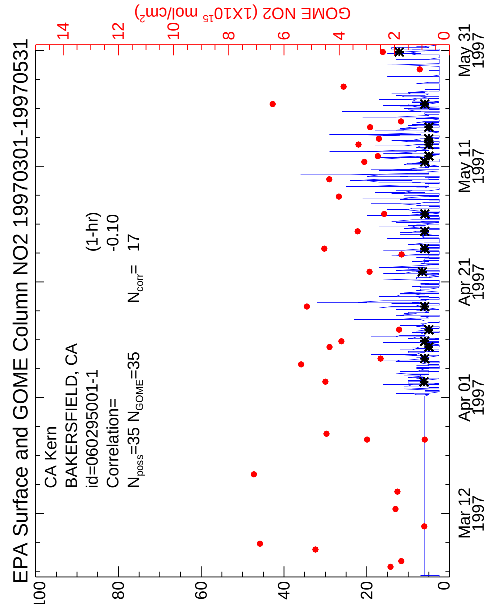

EPA Surface and GOME Column NO2 19961201-19970228
CA Kern
BAKERSFIELD, CA
id=060290232-1
Correlation= (1-hr) 0.60
N_poss=15 N_GOME=15 N_corr= 15
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997

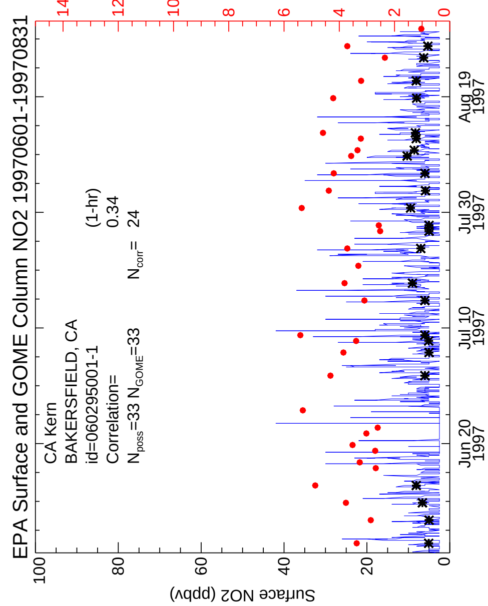

EPA Surface and GOME Column NO2 19970301-19970531
CA Kern
BAKERSFIELD, CA
id=060290232-1
Correlation= (1-hr) 0.08
N_poss=31 N_GOME=31 N_corr= 27
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997

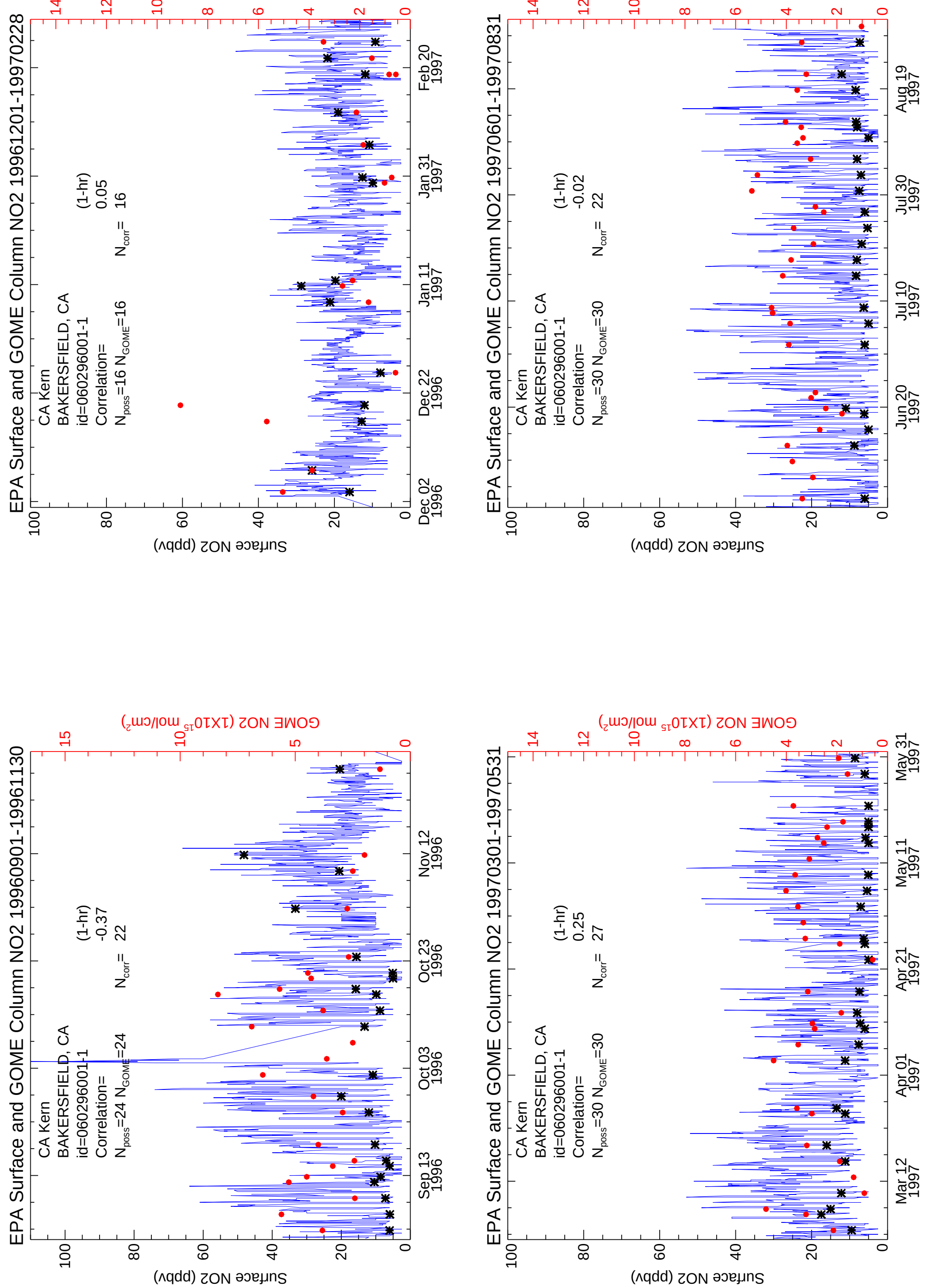

EPA Surface and GOME Column NO2 19970601-19970831
CA Kern
BAKERSFIELD, CA
id=060290232-1
Correlation= (1-hr) 0.13
N_poss=32 N_GOME=32 N_corr= 31
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

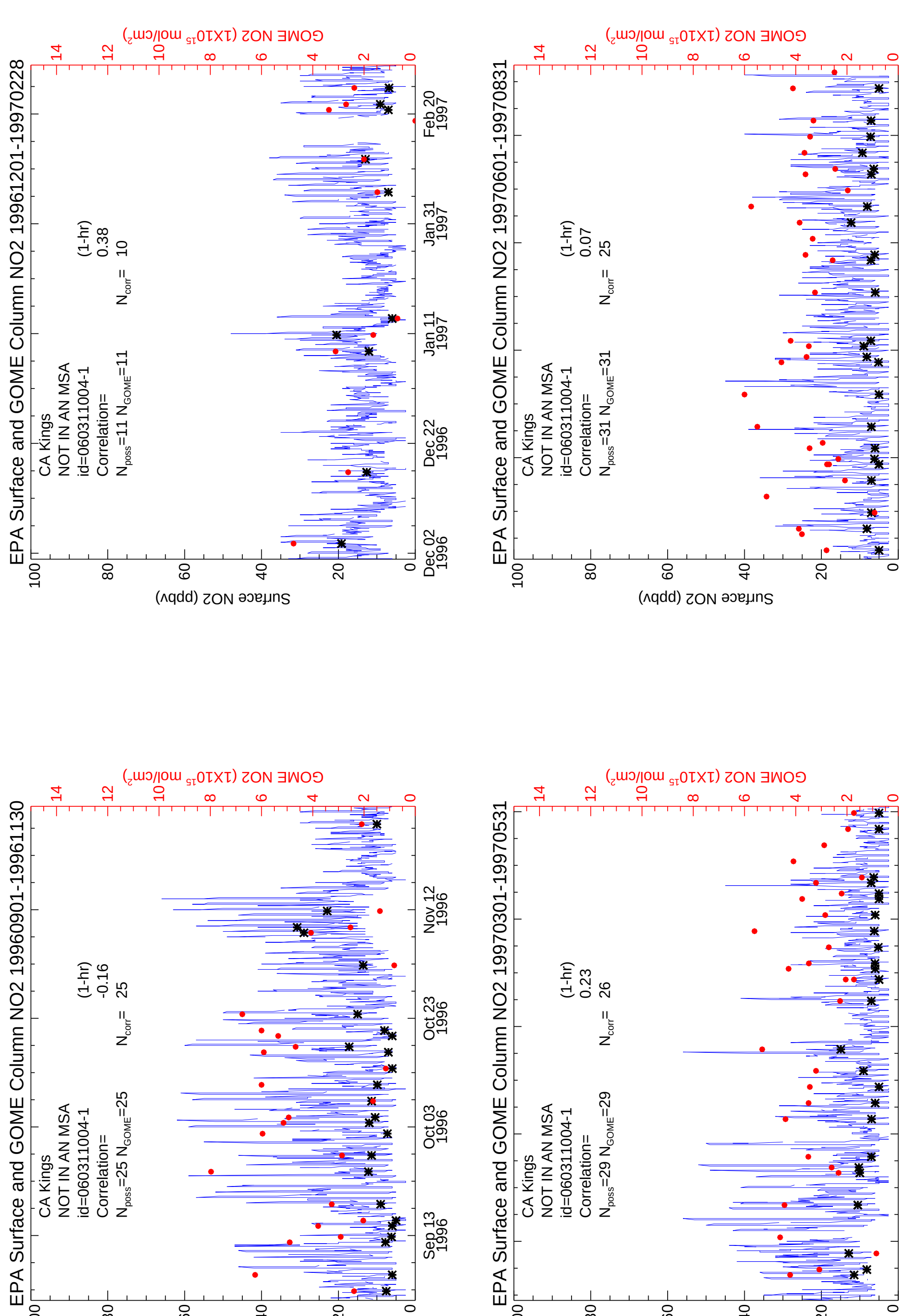

EPA Surface and GOME Column NO2 19960901-19961130
CA Kern
BAKERSFIELD, CA
id=060295001-1
Correlation= (1-hr) 0.16
N_poss=30 N_GOME=30
N_corr= 30
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996


EPA Surface and GOME Column NO2 19961201-19970228
CA Kern
BAKERSFIELD, CA
id=060295001-1
Correlation= (1-hr) 0.52
N_poss=16 N_GOME=15
N_corr= 15
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997

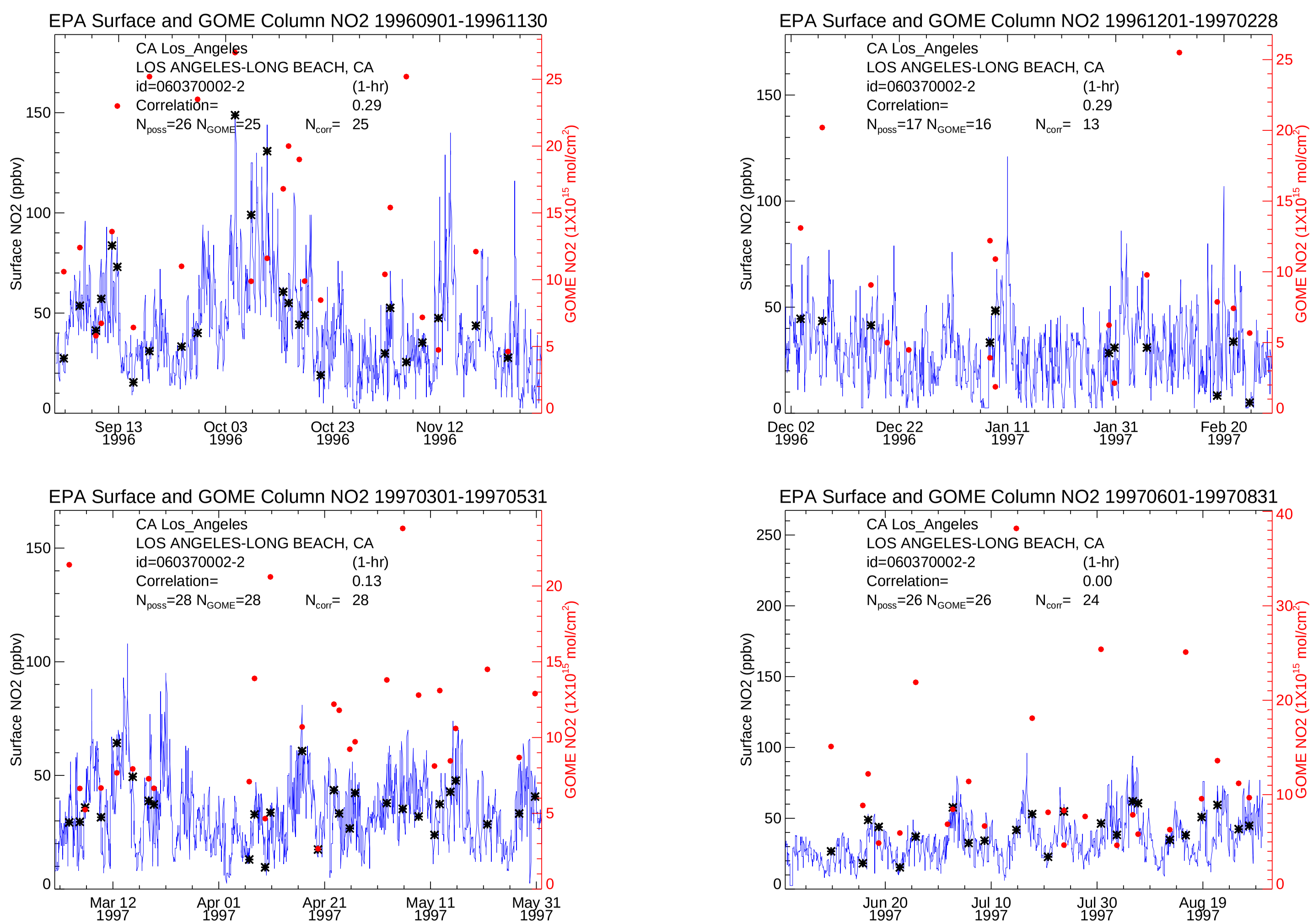

EPA Surface and GOME Column NO2 19970301-19970531
CA Kern
BAKERSFIELD, CA
id=060295001-1
Correlation= (1-hr) -0.10
N_poss=35 N_GOME=35
N_corr= 17
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997


EPA Surface and GOME Column NO2 19970601-19970831
CA Kern
BAKERSFIELD, CA
id=060295001-1
Correlation= (1-hr) 0.34
N_poss=33 N_GOME=33
N_corr= 24
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

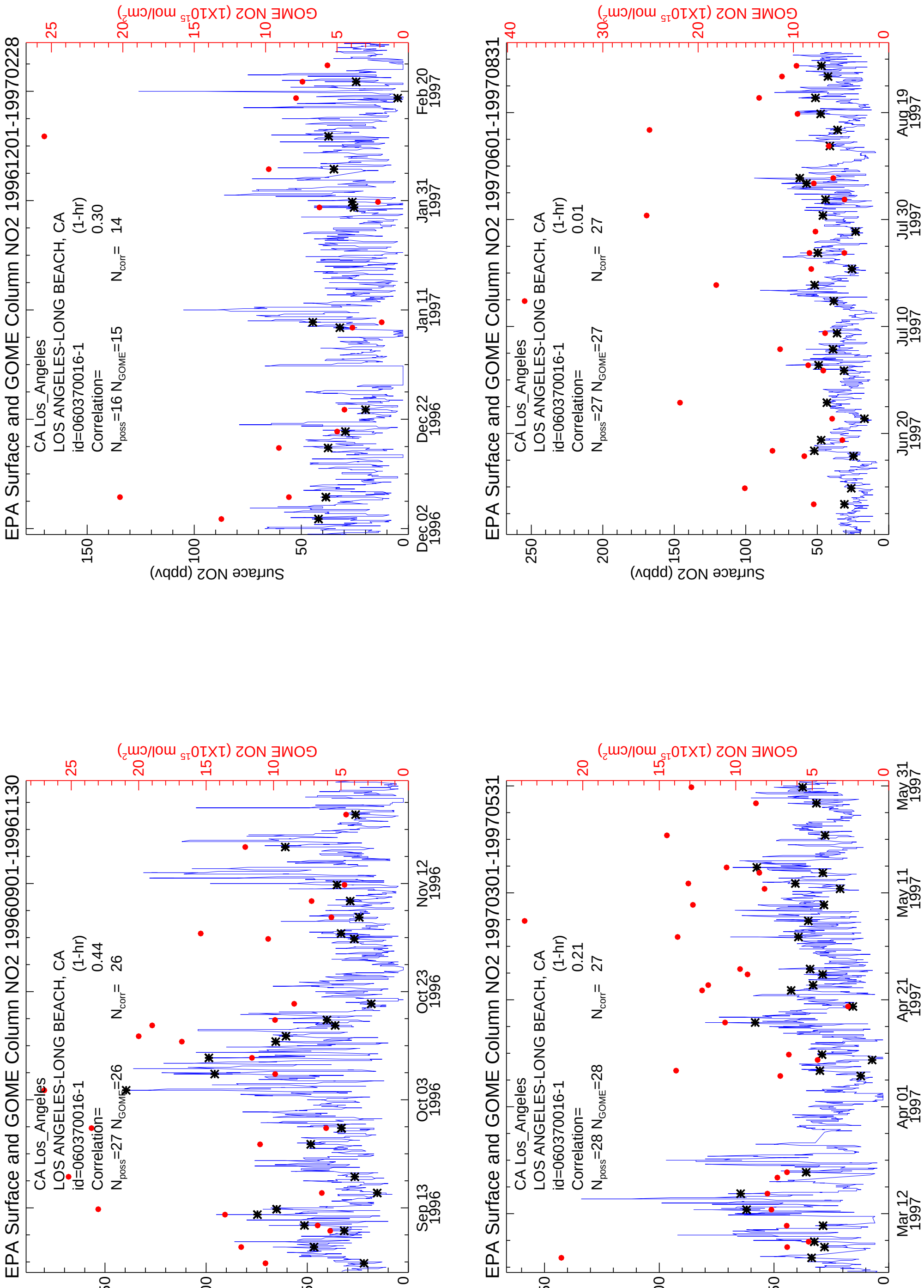

EPA Surface and GOME Column NO2 19960901-19961130
CA Kern
BAKERSFIELD, CA
id=060296001-1
Correlation= (1-hr) -0.37
Nposs=24 NGOME=24
Ncorr= 22
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
EPA Surface and GOME Column NO2 19961201-19970228
CA Kern
BAKERSFIELD, CA
id=060296001-1
Correlation= (1-hr) 0.05
Nposs=16 NGOME=16
Ncorr= 16
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
EPA Surface and GOME Column NO2 19970301-19970531
CA Kern
BAKERSFIELD, CA
id=060296001-1
Correlation= (1-hr) 0.25
Nposs=30 NGOME=30
Ncorr= 27
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
EPA Surface and GOME Column NO2 19970601-19970831
CA Kern
BAKERSFIELD, CA
id=060296001-1
Correlation= (1-hr) -0.02
Nposs=30 NGOME=30
Ncorr= 22
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

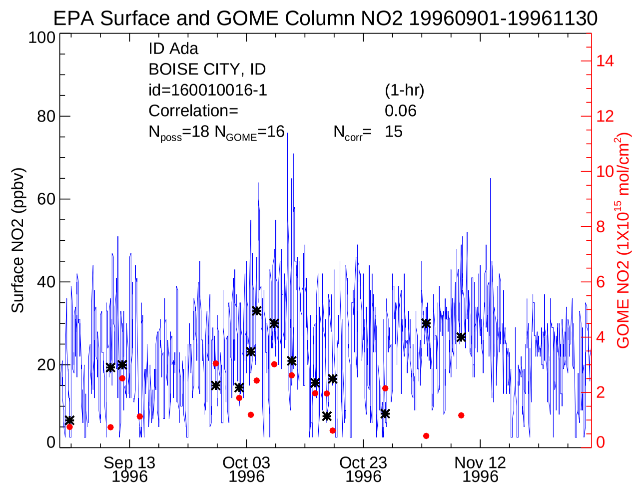


EPA Surface and GOME Column NO2 19960901-19961130
CA Kings
NOT IN AN MSA
id=060311004-1
Correlation= (1-hr) -0.16
Nposs=25 NGOME=25 Ncorr= 25
EPA Surface and GOME Column NO2 19961201-19970228
CA Kings
NOT IN AN MSA
id=060311004-1
Correlation= (1-hr) 0.38
Nposs=11 NGOME=11 Ncorr= 10
EPA Surface and GOME Column NO2 19970301-19970531
CA Kings
NOT IN AN MSA
id=060311004-1
Correlation= (1-hr) 0.23
Nposs=29 NGOME=29 Ncorr= 26
EPA Surface and GOME Column NO2 19970601-19970831
CA Kings
NOT IN AN MSA
id=060311004-1
Correlation= (1-hr) 0.07
Nposs=31 NGOME=31 Ncorr= 25
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997



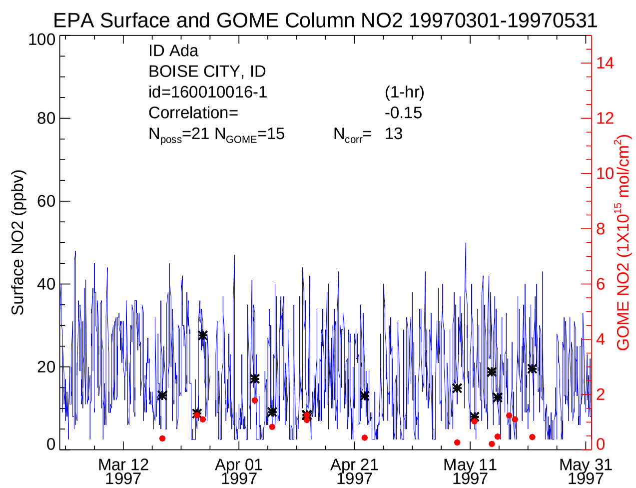
EPA Surface and GOME Column NO2 19960901-19961130
CA Los_Angeles
LOS ANGELES-LONG BEACH, CA
id=060370002-2 (1-hr)
Correlation= 0.29
Nposs=26 NGOME=25 Ncorr= 25
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
EPA Surface and GOME Column NO2 19961201-19970228
CA Los_Angeles
LOS ANGELES-LONG BEACH, CA
id=060370002-2 (1-hr)
Correlation= 0.29
Nposs=17 NGOME=16 Ncorr= 13
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
EPA Surface and GOME Column NO2 19970301-19970531
CA Los_Angeles
LOS ANGELES-LONG BEACH, CA
id=060370002-2 (1-hr)
Correlation= 0.13
Nposs=28 NGOME=28 Ncorr= 28
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
EPA Surface and GOME Column NO2 19970601-19970831
CA Los_Angeles
LOS ANGELES-LONG BEACH, CA
id=060370002-2 (1-hr)
Correlation= 0.00
Nposs=26 NGOME=26 Ncorr= 24
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

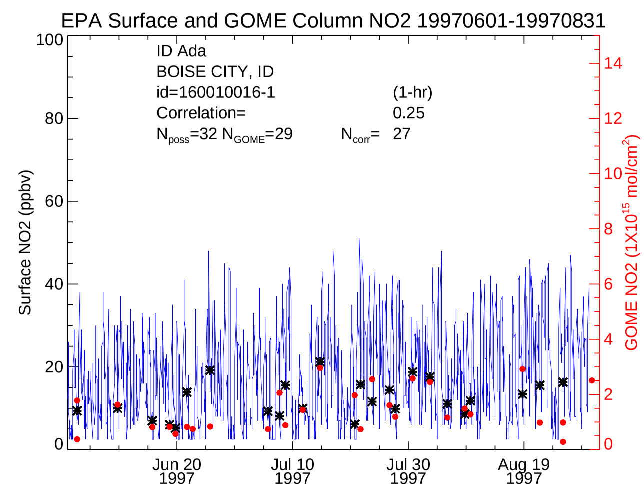

EPA Surface and GOME Column NO2 19960901-19961130
CA Los_Angeles
LOS ANGELES-LONG BEACH, CA
id=060370016-1 (1-hr)
Correlation= 0.44
N_poss=27 N_GOME=26 N_corr= 26
Surface NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Sep 13 1996
Oct 03 1996
Oct 23 1996
Nov 12 1996
EPA Surface and GOME Column NO2 19961201-19970228
CA Los_Angeles
LOS ANGELES-LONG BEACH, CA
id=060370016-1 (1-hr)
Correlation= 0.30
N_poss=16 N_GOME=15 N_corr= 14
Dec 02 1996
Dec 22 1996
Jan 11 1997
Jan 31 1997
Feb 20 1997
EPA Surface and GOME Column NO2 19970301-19970531
CA Los_Angeles
LOS ANGELES-LONG BEACH, CA
id=060370016-1 (1-hr)
Correlation= 0.21
N_poss=28 N_GOME=28 N_corr= 27
Mar 12 1997
Apr 01 1997
Apr 21 1997
May 11 1997
May 31 1997
EPA Surface and GOME Column NO2 19970601-19970831
CA Los_Angeles
LOS ANGELES-LONG BEACH, CA
id=060370016-1 (1-hr)
Correlation= 0.01
N_poss=27 N_GOME=27 N_corr= 27
Jun 20 1997
Jul 10 1997
Jul 30 1997
Aug 19 1997

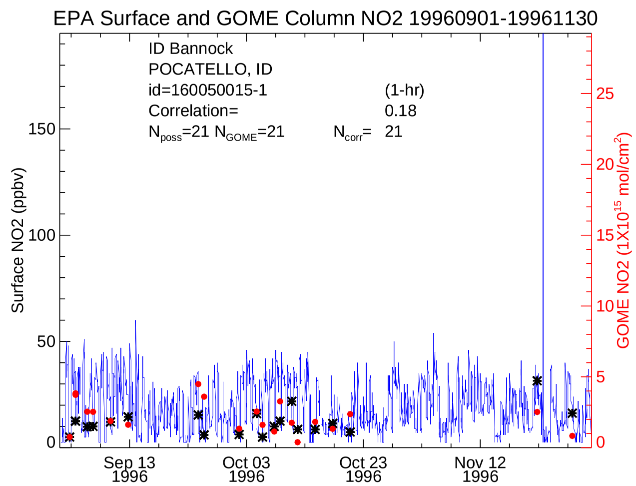


Insufficient Coincident Data

Winter (12/1/96-2/28/97)







Insufficient Coincident Data
Winter (12/1/96-2/28/97)

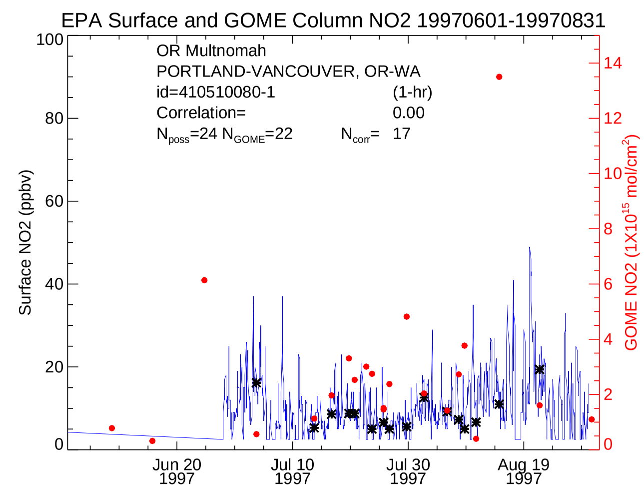
Insufficient Coincident Data
Spring (3/1/97-5/31/97)

Insufficient Coincident Data
Summer (6/1/97-8/31/97)

Insufficient Coincident Data
Fall (9/1/96-11/30/96)

Insufficient Coincident Data
Winter (12/1/96-2/28/97)

Insufficient Coincident Data
Spring (3/1/97-5/31/97)



Insufficient Coincident Data

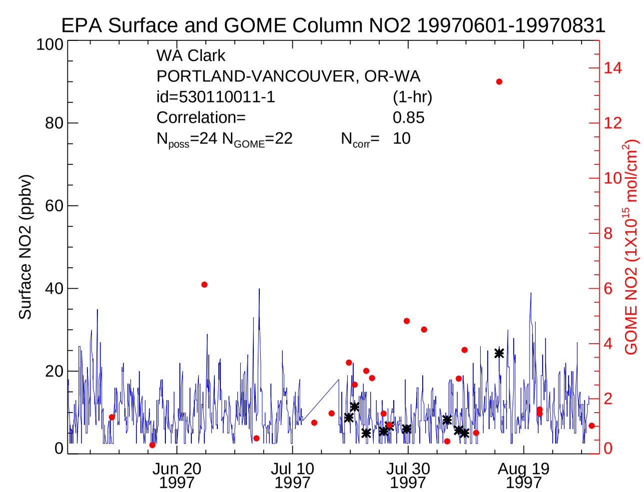
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

Insufficient Coincident Data

Spring (3/1/97-5/31/97)



Insufficient Coincident Data

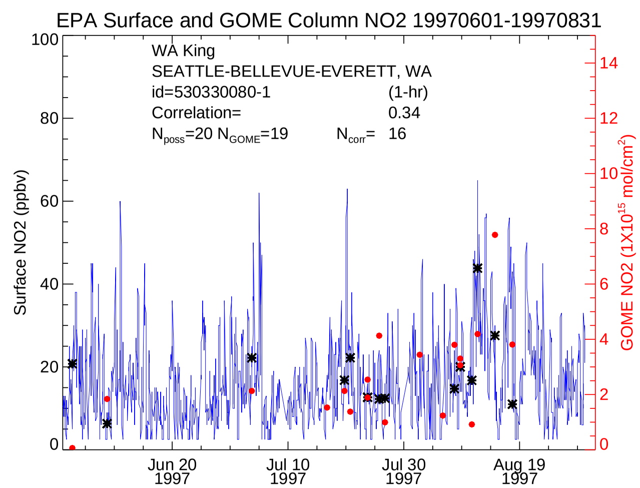
Fall (9/1/96-11/30/96)

Insufficient Coincident Data

Winter (12/1/96-2/28/97)

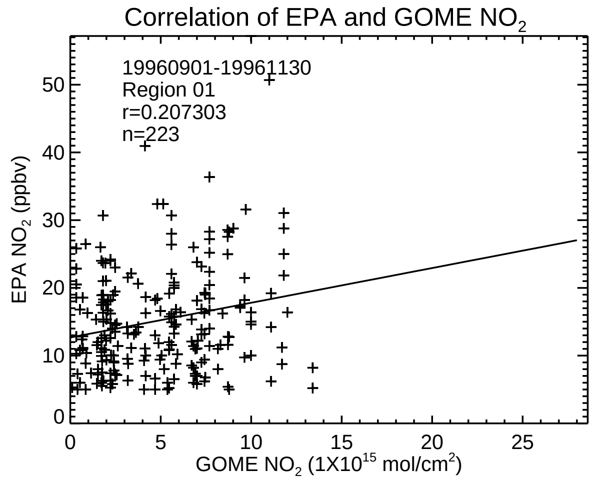
Insufficient Coincident Data

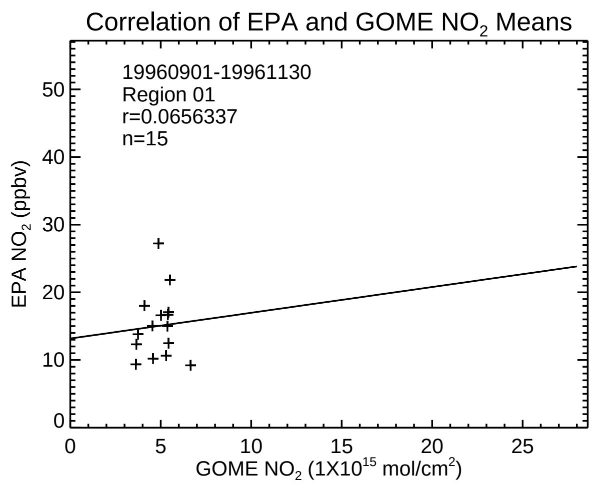
Spring (3/1/97-5/31/97)

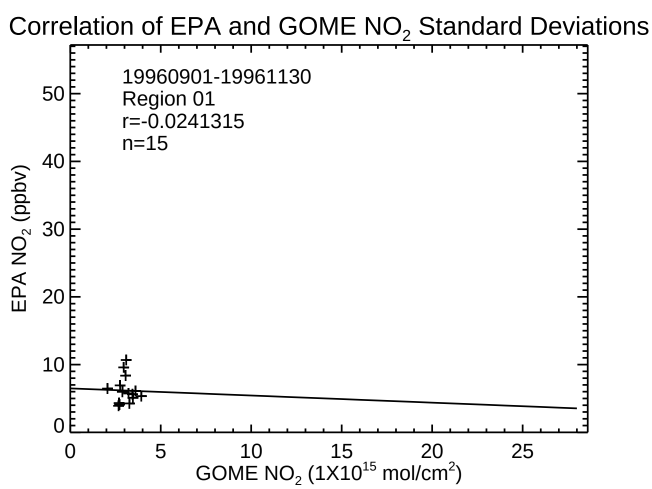


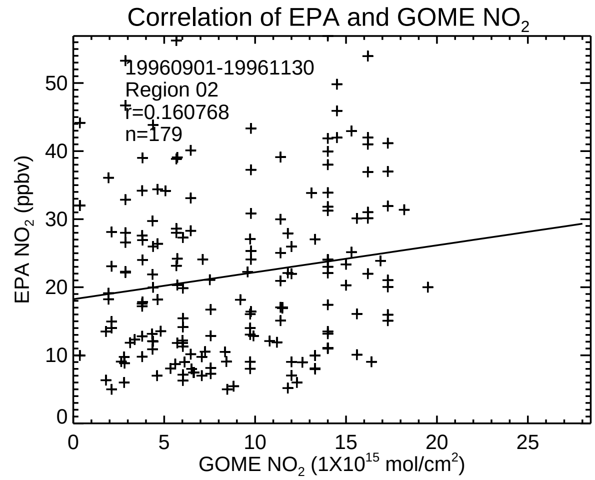
B Regional Mean Satellite and In-Situ Comparisons

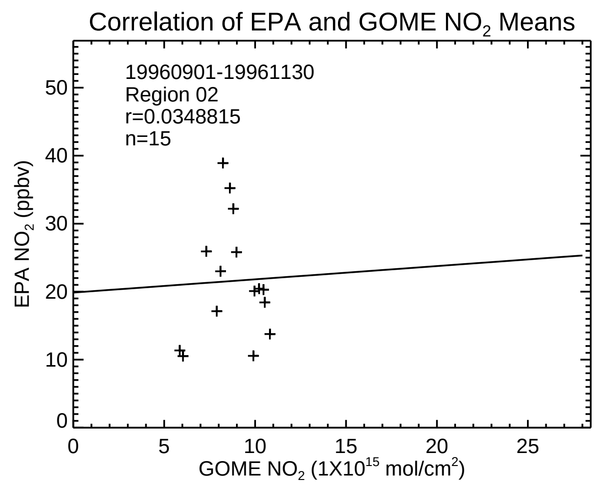
This appendix contains the spatial correlations between measurements, means, and standard deviations for each EPA region and season (fall 1996 through summer 1997). Only the regions where at least 10 coincidences occur for at least 10 ground stations per season are included. This ensures there will be at least 10 points in the mean and standard deviation panels from which the correlation is computed. During winter only region 9 meets this criteria. In addition, regions 7 and 10 did not meet this criteria during any season.

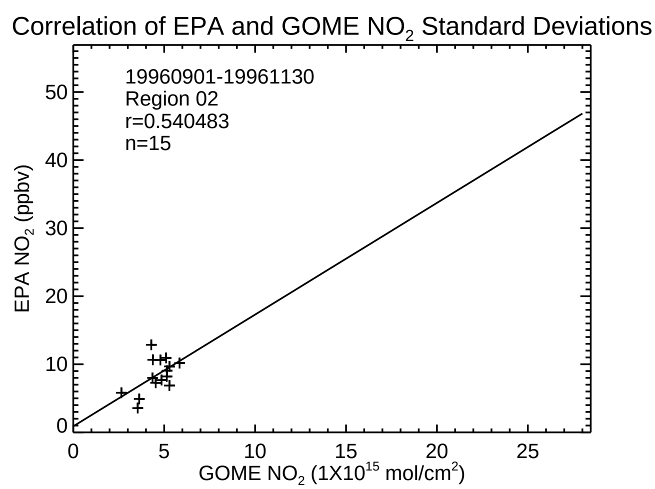

Correlation of EPA and GOME NO2
19960901-19961130
Region 01
r=0.207303
n=223
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25

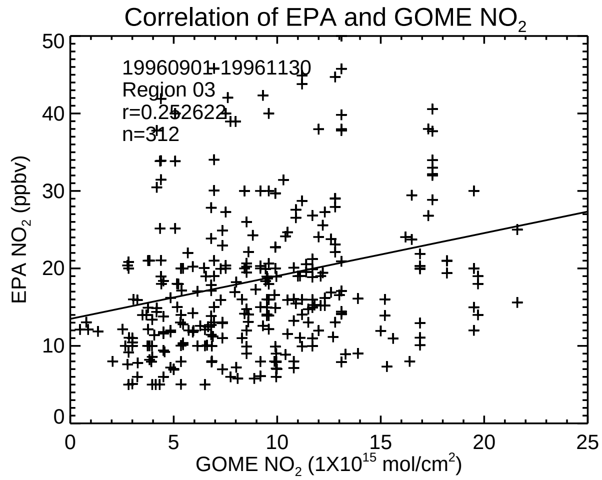

Correlation of EPA and GOME NO2 Means
19960901-19961130
Region 01
r=0.0656337
n=15
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25

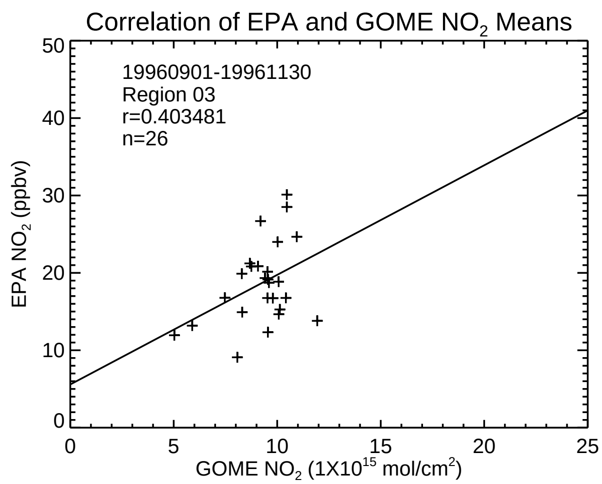

Correlation of EPA and GOME NO2 Standard Deviations
19960901-19961130
Region 01
r=-0.0241315
n=15
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25

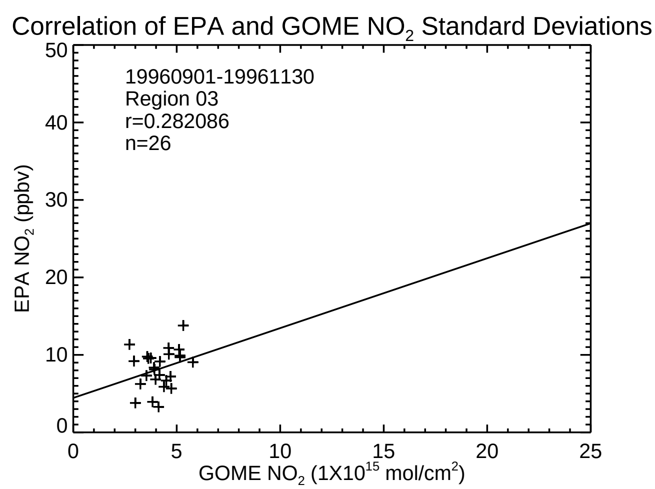

Correlation of EPA and GOME NO2
19960901-19961130
Region 02
r=0.160768
n=179
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)


Correlation of EPA and GOME NO2 Means
19960901-19961130
Region 02
r=0.0348815
n=15
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

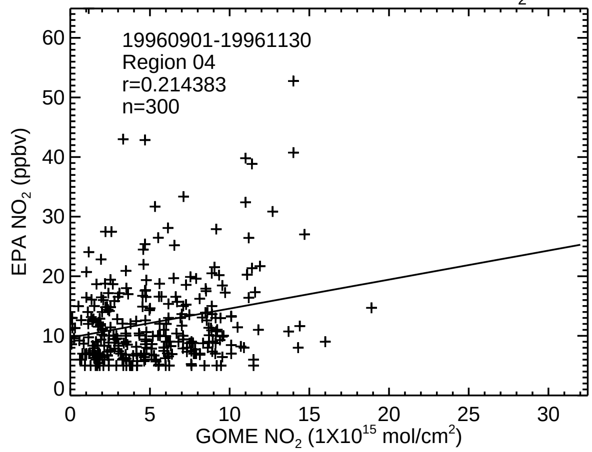

Correlation of EPA and GOME NO2 Standard Deviations
19960901-19961130
Region 02
r=0.540483
n=15
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)


Correlation of EPA and GOME NO_2
19960901-19961130
Region 03
r=0.252622
n=312
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)

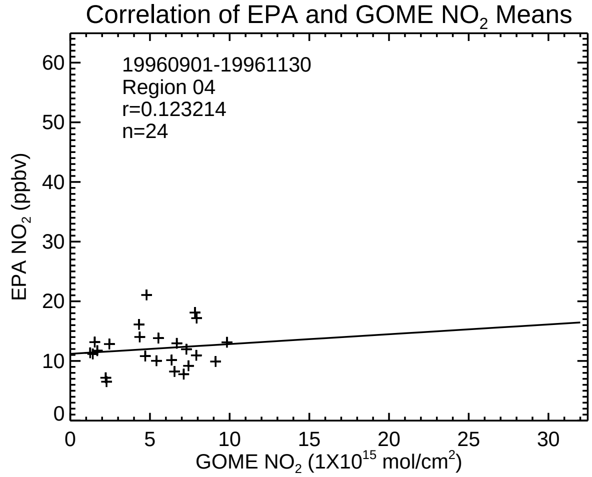

Correlation of EPA and GOME NO_2 Means
19960901-19961130
Region 03
r=0.403481
n=26
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)


Correlation of EPA and GOME NO_2 Standard Deviations
19960901-19961130
Region 03
r=0.282086
n=26
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)

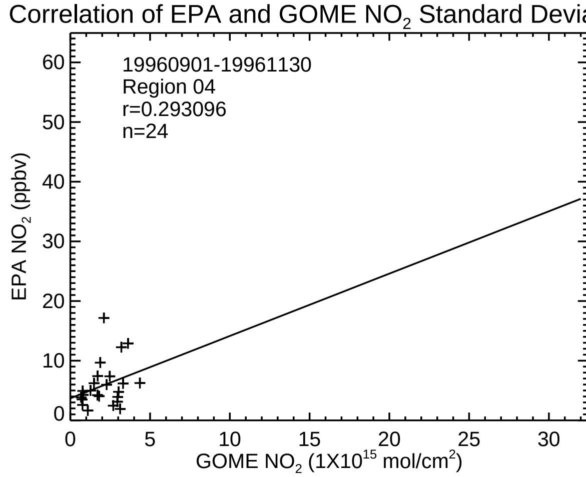
Correlation of EPA and GOME NO_2

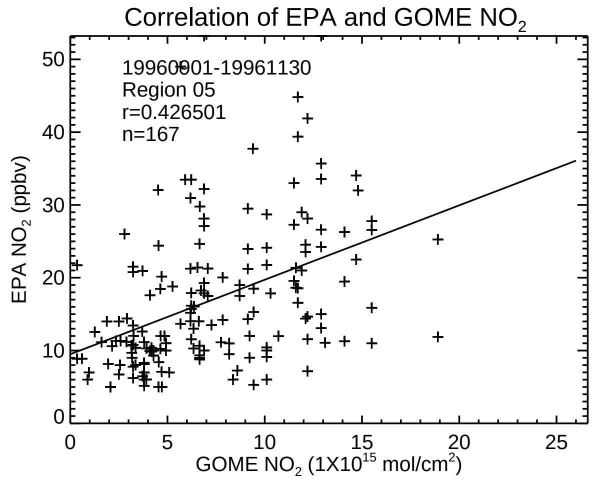


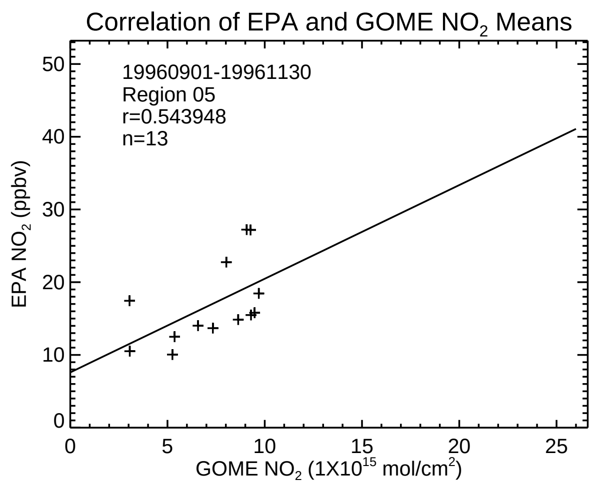
Correlation of EPA and GOME NO_2 Means

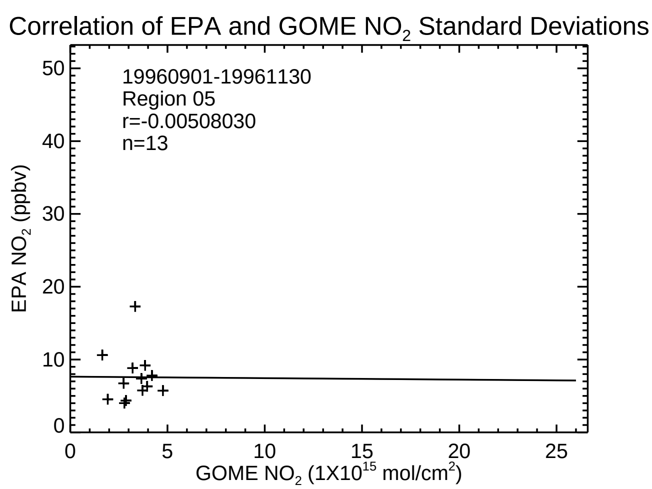


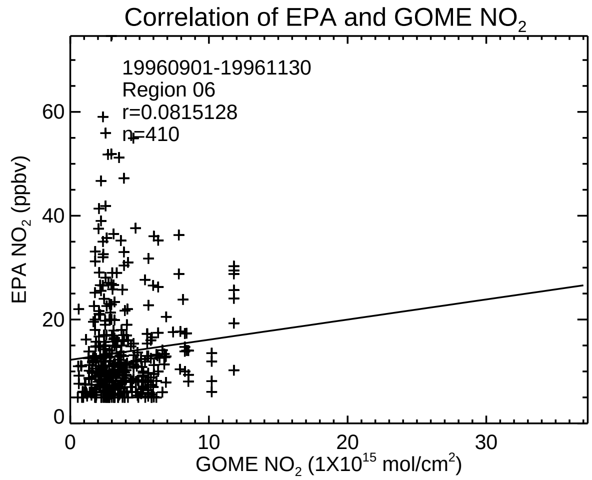
Correlation of EPA and GOME NO_2 Standard Deviations

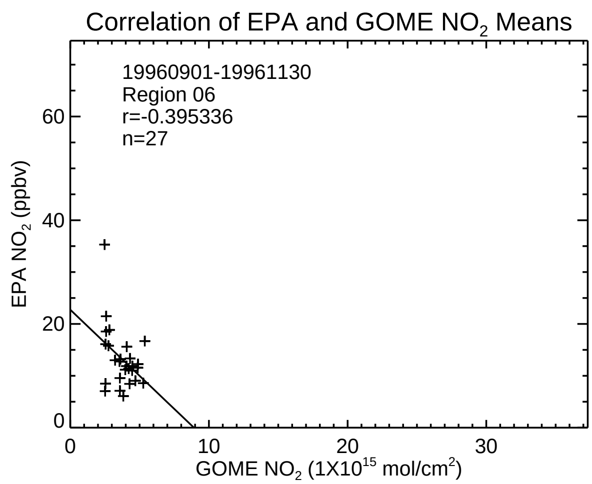


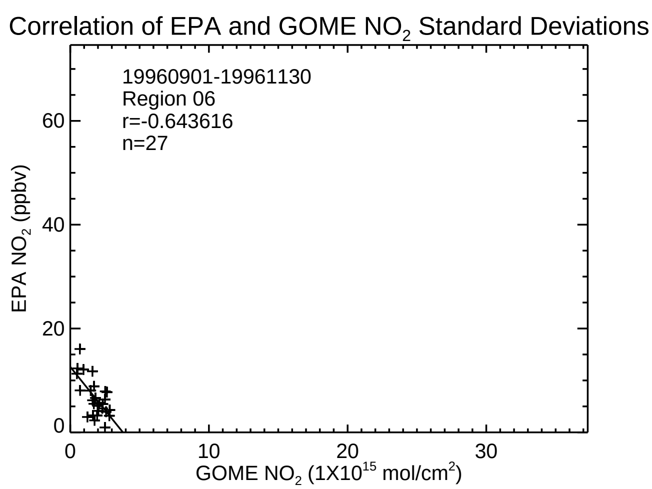

Correlation of EPA and GOME NO_2
19960901-19961130
Region 05
r=0.426501
n=167
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
10
20
30
40
50
5
15
25

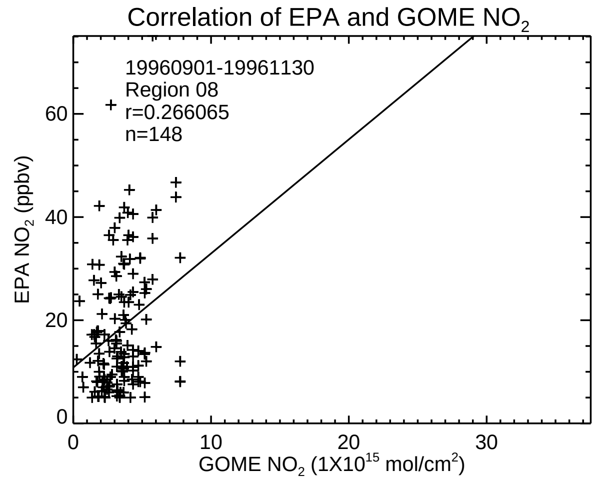

Correlation of EPA and GOME NO_2 Means
19960901-19961130
Region 05
r=0.543948
n=13
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
10
20
30
40
50
5
15
25

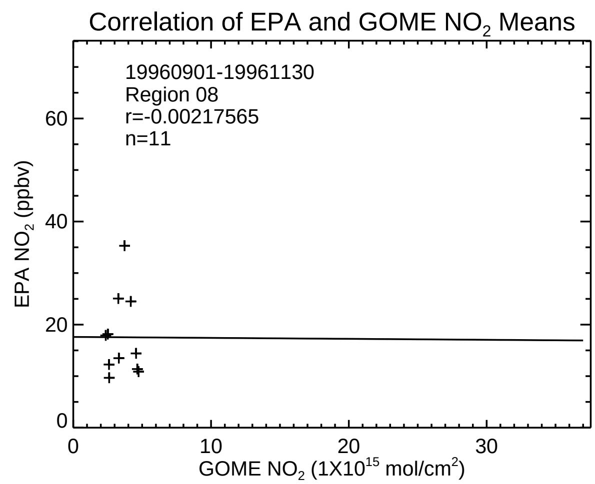

Correlation of EPA and GOME NO_2 Standard Deviations
19960901-19961130
Region 05
r=-0.00508030
n=13
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
10
20
30
40
50
5
15
25

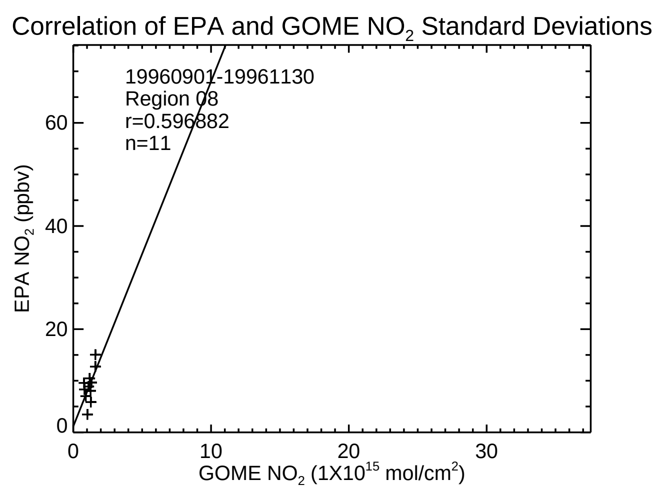

Correlation of EPA and GOME NO_2
19960901-19961130
Region 06
r=0.0815128
n=410
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
20
40
60
0
10
20
30

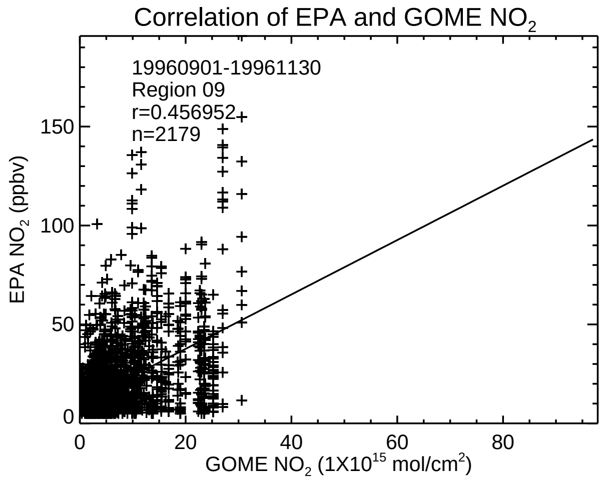

Correlation of EPA and GOME NO_2 Means
19960901-19961130
Region 06
r=-0.395336
n=27
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
20
40
60
0
10
20
30

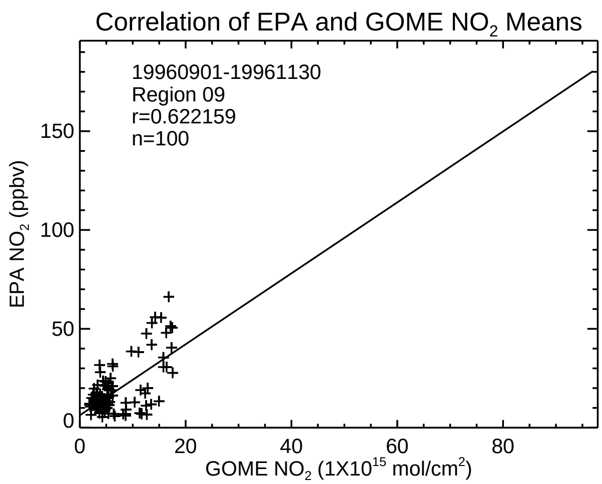

Correlation of EPA and GOME NO_2 Standard Deviations
19960901-19961130
Region 06
r=-0.643616
n=27
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
20
40
60
0
10
20
30

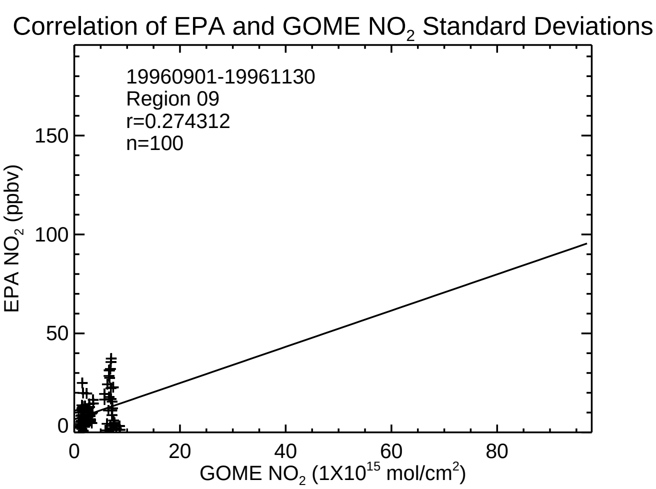

Correlation of EPA and GOME NO_2
19960901-19961130
Region 08
r=0.266065
n=148
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
10
20
30
40
60

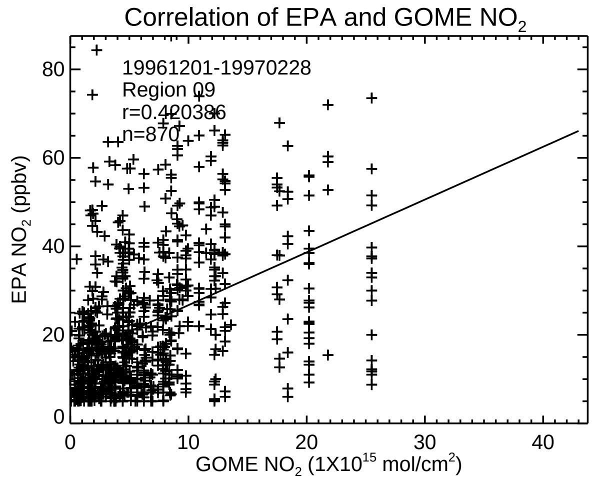

Correlation of EPA and GOME NO_2 Means
19960901-19961130
Region 08
r=-0.00217565
n=11
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
10
20
30
40
60

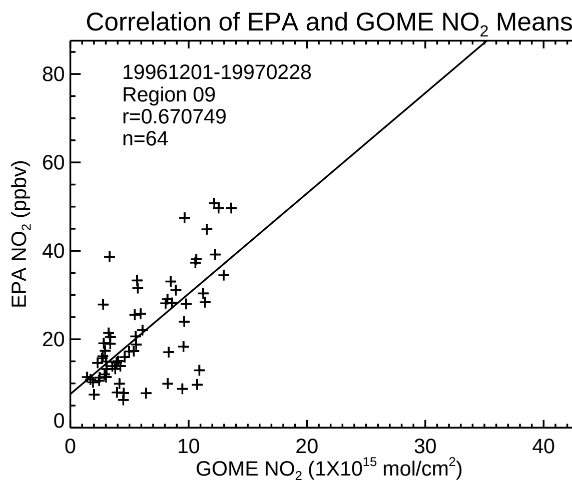

Correlation of EPA and GOME NO_2 Standard Deviations
19960901-19961130
Region 08
r=0.596882
n=11
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
10
20
30
40
60

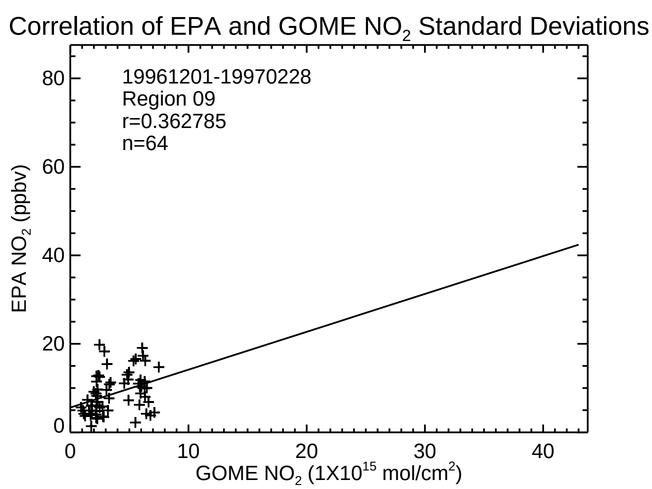

Correlation of EPA and GOME NO2
19960901-19961130
Region 09
r=0.456952
n=2179
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
50
100
150
0
20
40
60
80

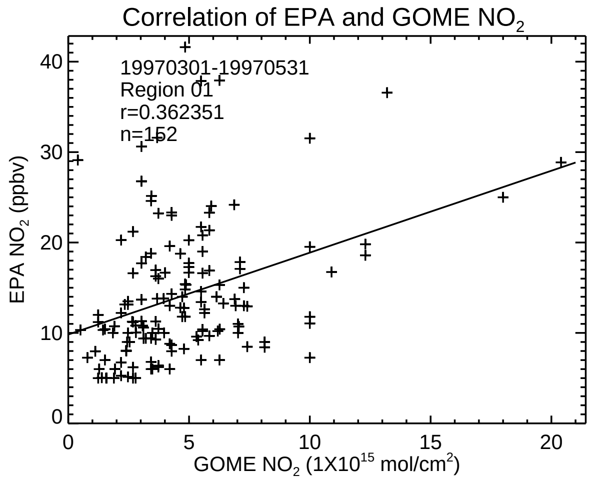

Correlation of EPA and GOME NO2 Means
19960901-19961130
Region 09
r=0.622159
n=100
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
50
100
150
0
20
40
60
80

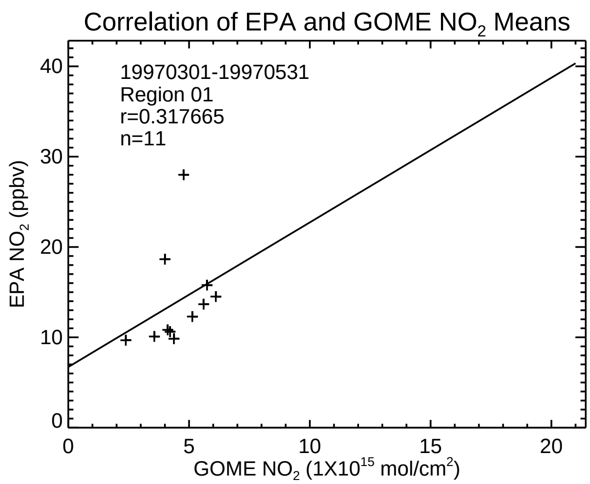

Correlation of EPA and GOME NO2 Standard Deviations
19960901-19961130
Region 09
r=0.274312
n=100
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
50
100
150
0
20
40
60
80

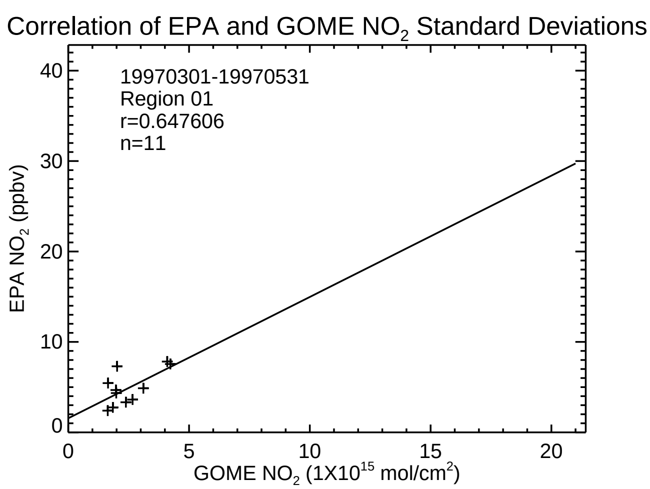

Correlation of EPA and GOME NO_2
19961201-19970228
Region 09
r=0.420386
n=870
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
20
40
60
80
0
10
20
30
40

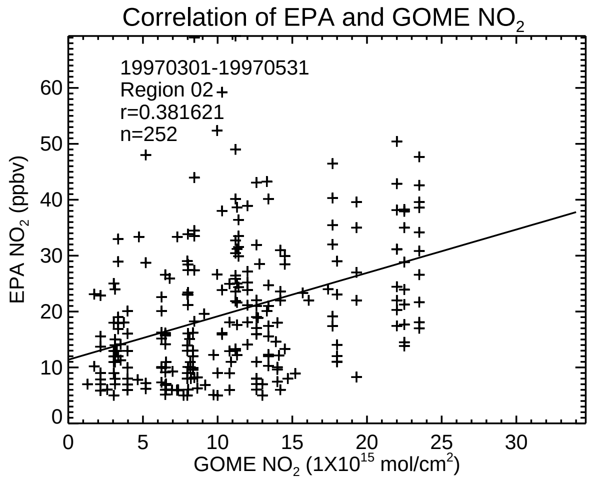

Correlation of EPA and GOME NO_2 Means
19961201-19970228
Region 09
r=0.670749
n=64
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
20
40
60
80
0
10
20
30
40

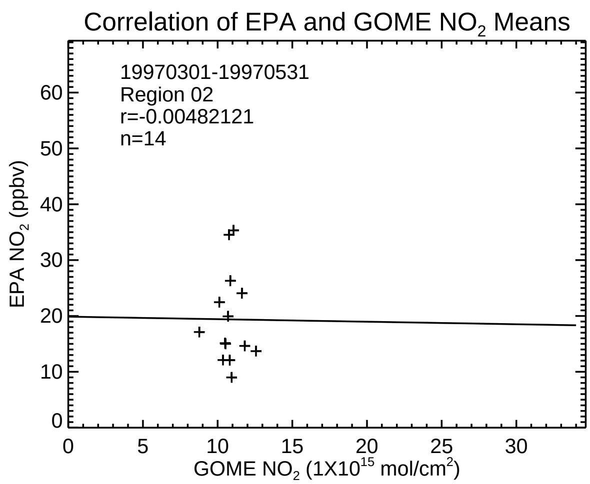

Correlation of EPA and GOME NO_2 Standard Deviations
19961201-19970228
Region 09
r=0.362785
n=64
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
20
40
60
80
0
10
20
30
40

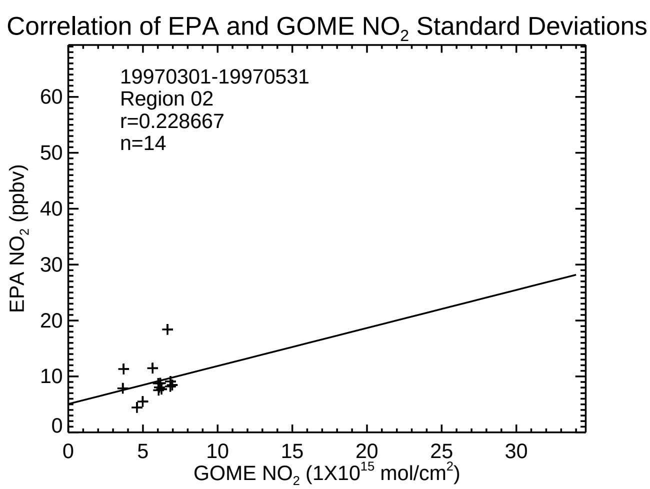

Correlation of EPA and GOME NO2
19970301-19970531
Region 01
r=0.362351
n=152
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

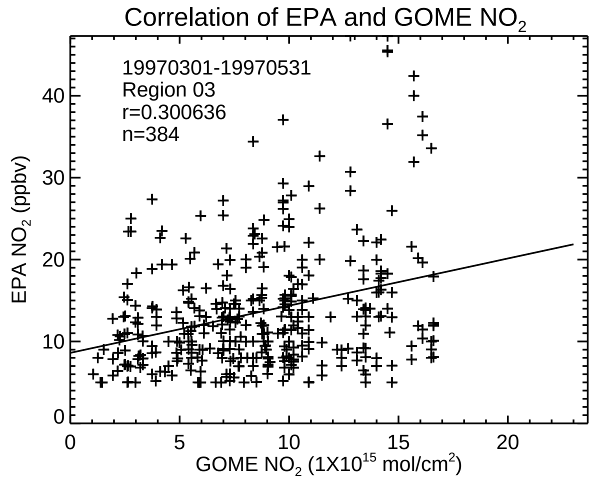

Correlation of EPA and GOME NO2 Means
19970301-19970531
Region 01
r=0.317665
n=11
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

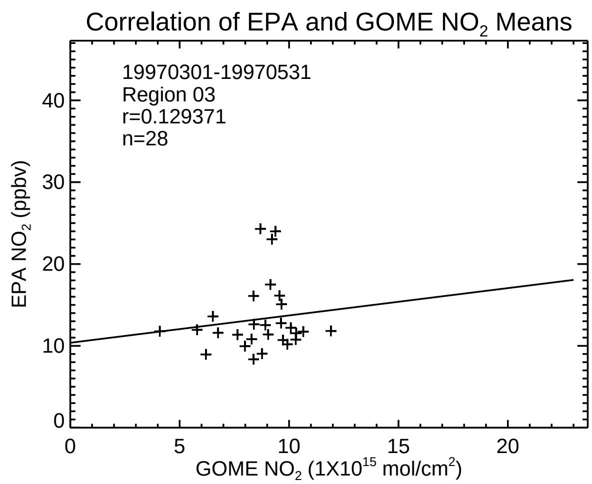

Correlation of EPA and GOME NO2 Standard Deviations
19970301-19970531
Region 01
r=0.647606
n=11
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

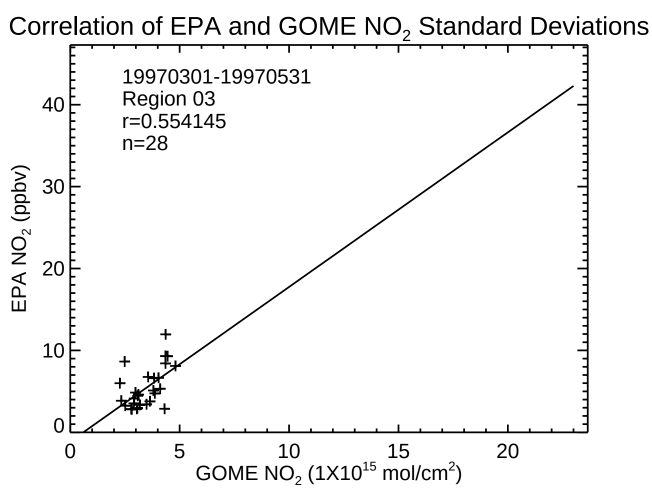

Correlation of EPA and GOME NO2
19970301-19970531
Region 02
r=0.381621
n=252
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

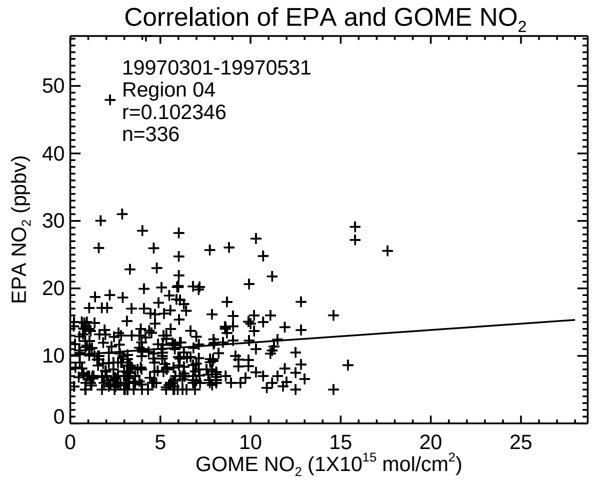

Correlation of EPA and GOME NO2 Means
19970301-19970531
Region 02
r=-0.00482121
n=14
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

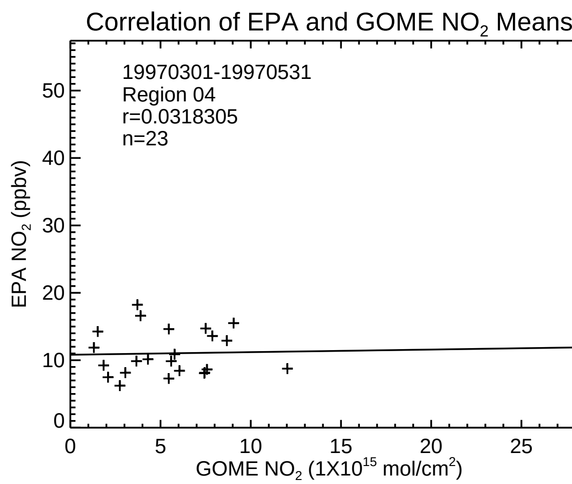

Correlation of EPA and GOME NO2 Standard Deviations
19970301-19970531
Region 02
r=0.228667
n=14
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

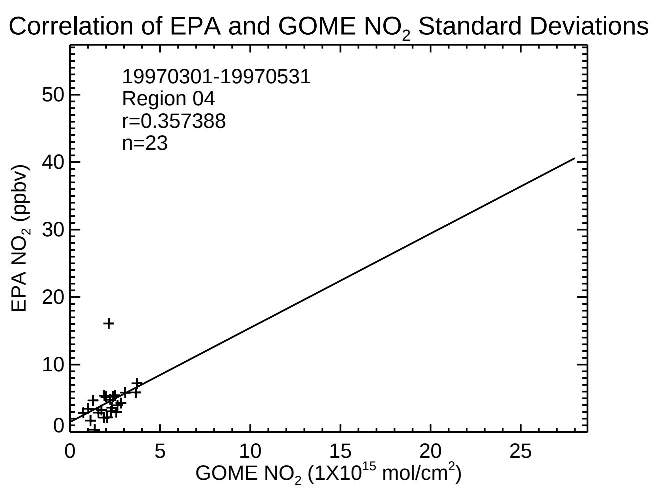

Correlation of EPA and GOME NO_2
19970301-19970531
Region 03
r=0.300636
n=384
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)


Correlation of EPA and GOME NO_2 Means
19970301-19970531
Region 03
r=0.129371
n=28
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)

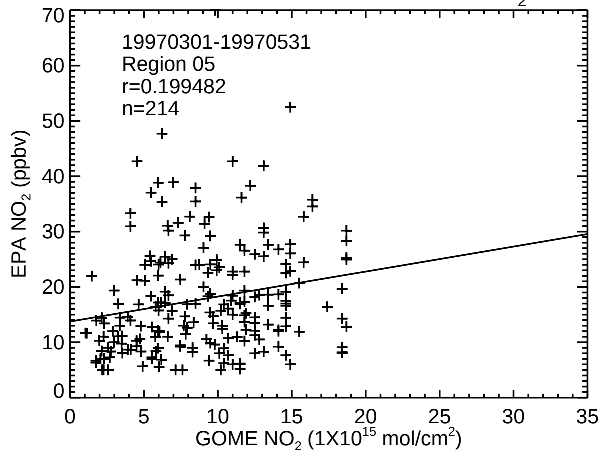

Correlation of EPA and GOME NO_2 Standard Deviations
19970301-19970531
Region 03
r=0.554145
n=28
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)


Correlation of EPA and GOME NO_2
19970301-19970531
Region 04
r=0.102346
n=336
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25

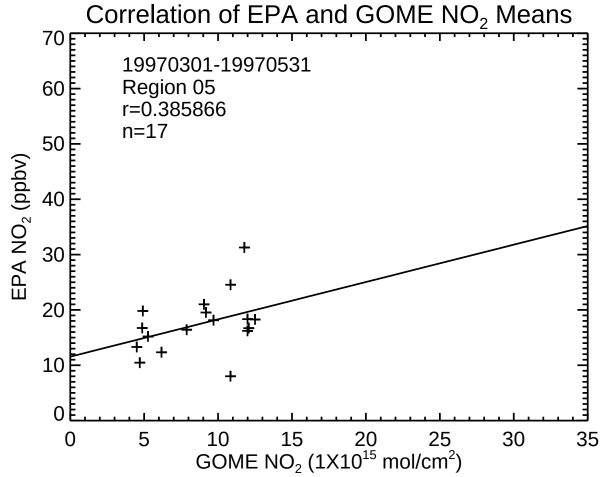

Correlation of EPA and GOME NO_2 Means
19970301-19970531
Region 04
r=0.0318305
n=23
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25


Correlation of EPA and GOME NO_2 Standard Deviations
19970301-19970531
Region 04
r=0.357388
n=23
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25

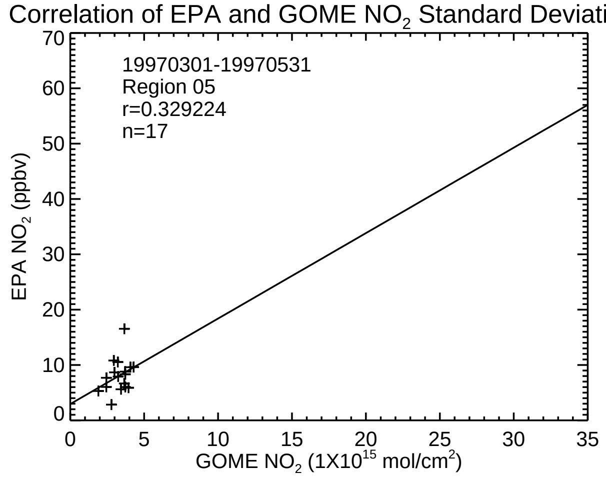
Correlation of EPA and GOME NO_2



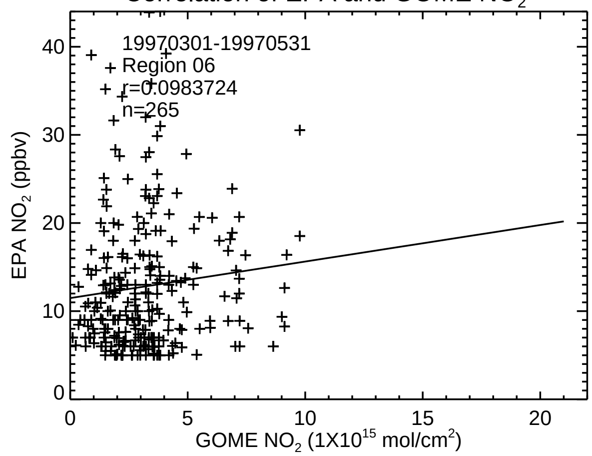
Correlation of EPA and GOME NO_2 Means



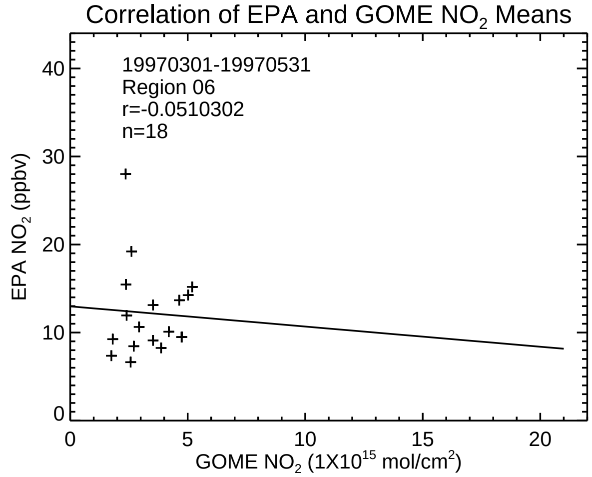
Correlation of EPA and GOME NO_2 Standard Deviations



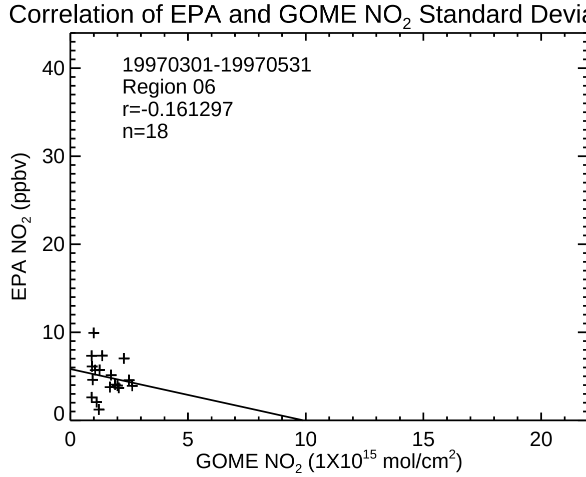
Correlation of EPA and GOME NO_2

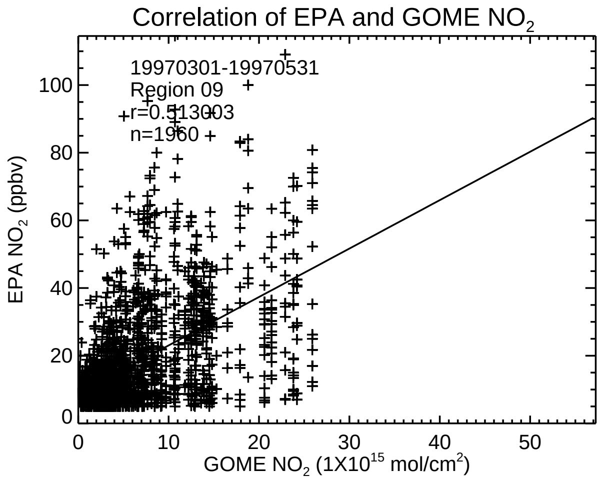


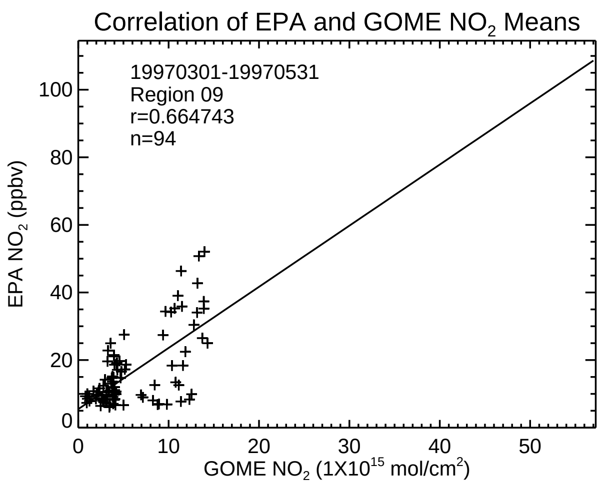
Correlation of EPA and GOME NO_2 Means

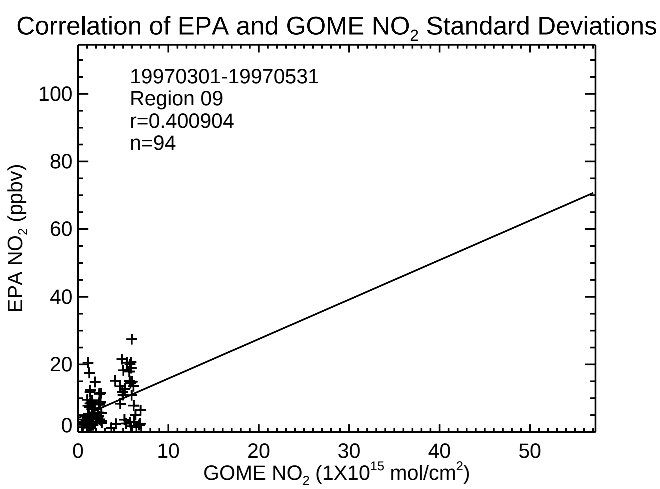


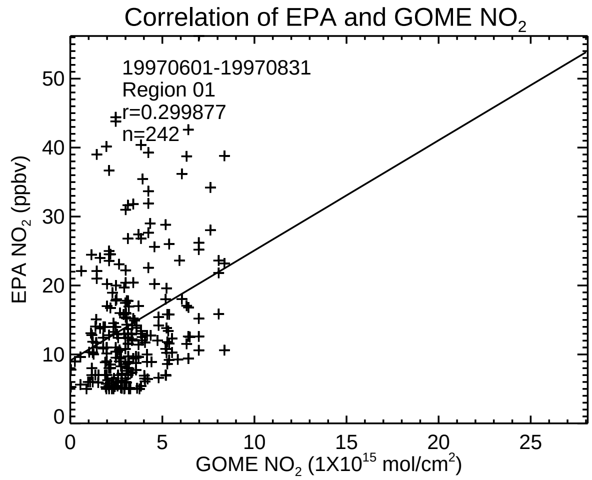
Correlation of EPA and GOME NO_2 Standard Deviations

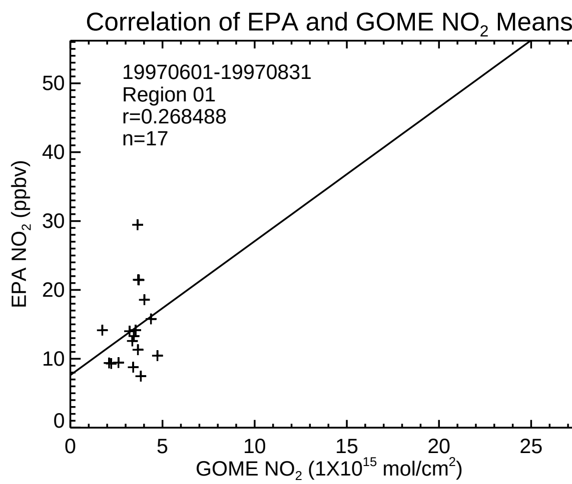


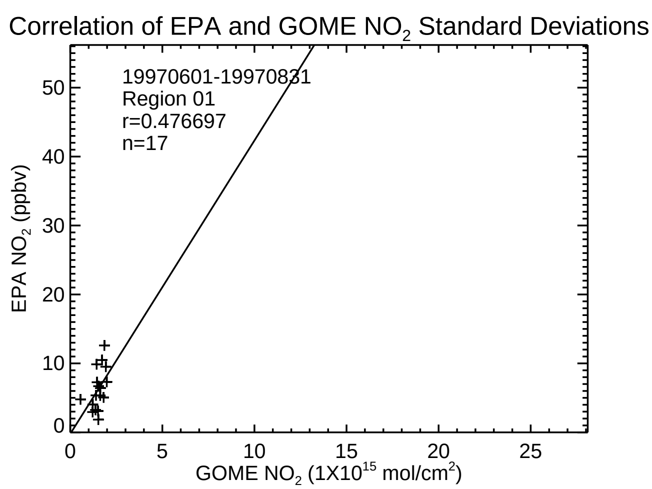

Correlation of EPA and GOME NO2
19970301-19970531
Region 09
r=0.513003
n=1960
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)


Correlation of EPA and GOME NO2 Means
19970301-19970531
Region 09
r=0.664743
n=94
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

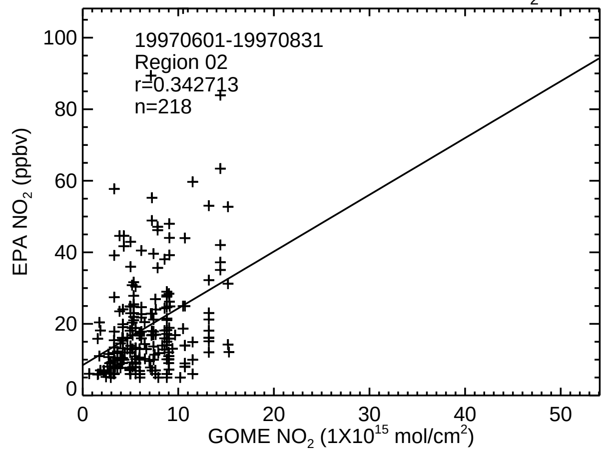

Correlation of EPA and GOME NO2 Standard Deviations
19970301-19970531
Region 09
r=0.400904
n=94
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)


Correlation of EPA and GOME NO2
19970601-19970831
Region 01
r=0.299877
n=242
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25

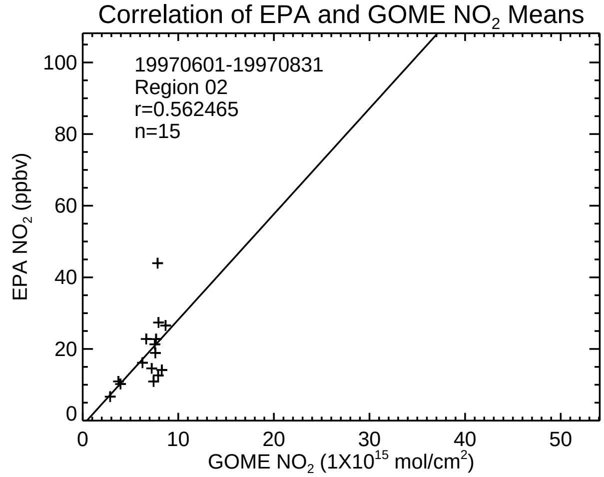

Correlation of EPA and GOME NO2 Means
19970601-19970831
Region 01
r=0.268488
n=17
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25


Correlation of EPA and GOME NO2 Standard Deviations
19970601-19970831
Region 01
r=0.476697
n=17
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25

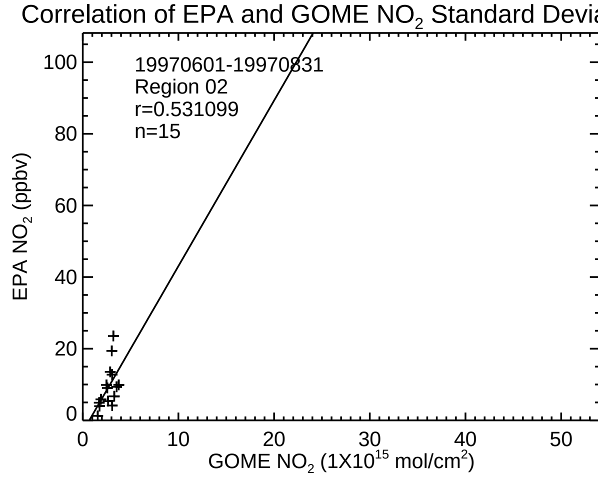
Correlation of EPA and GOME NO_2

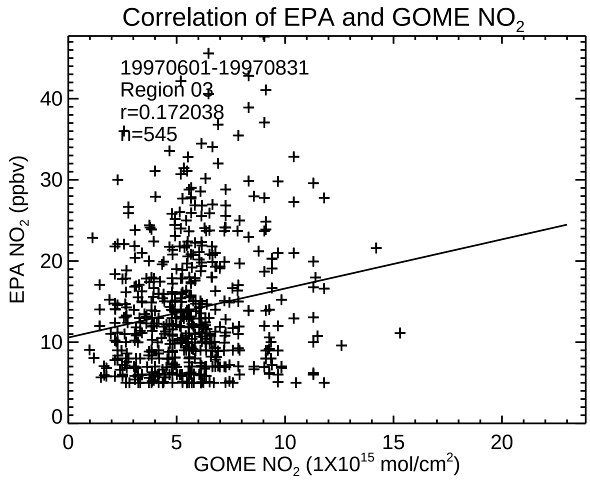


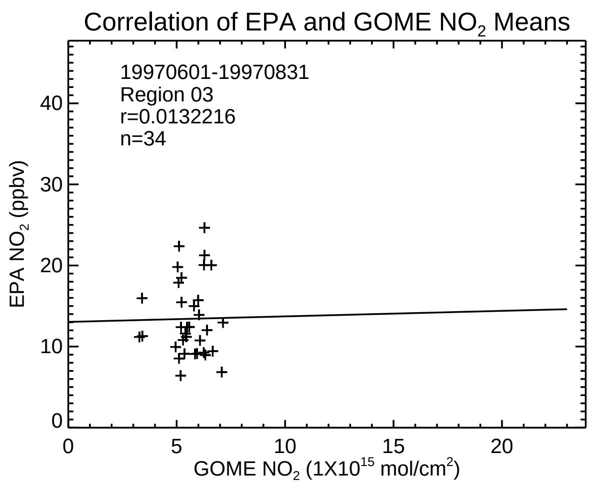
Correlation of EPA and GOME NO_2 Means

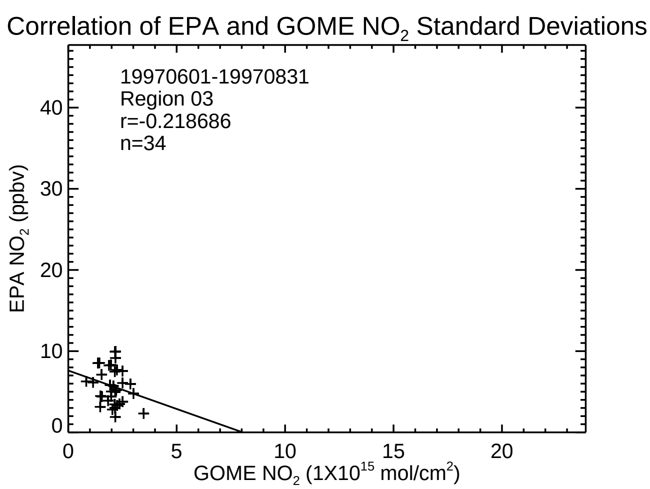


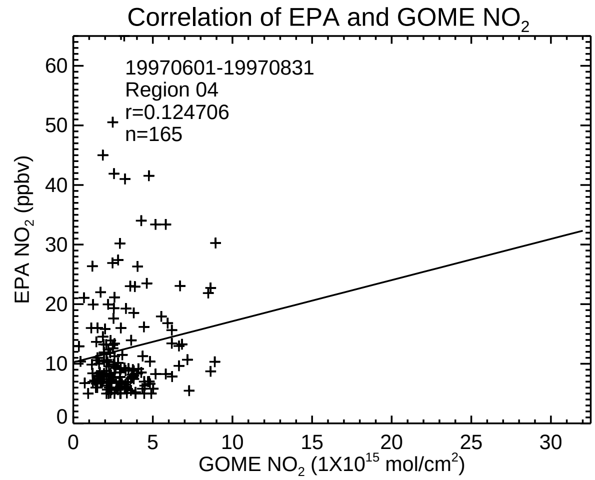
Correlation of EPA and GOME NO_2 Standard Deviations

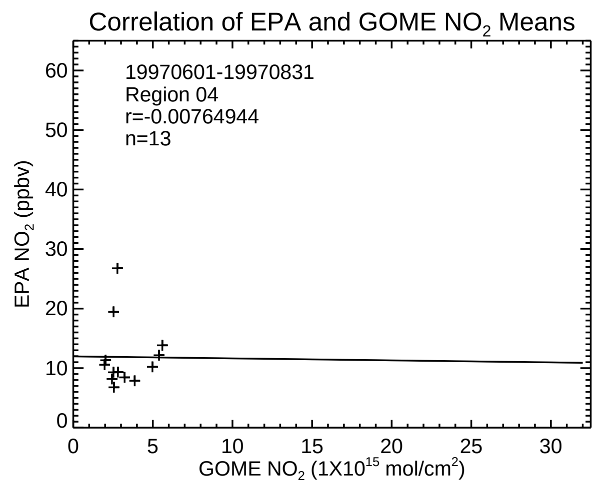


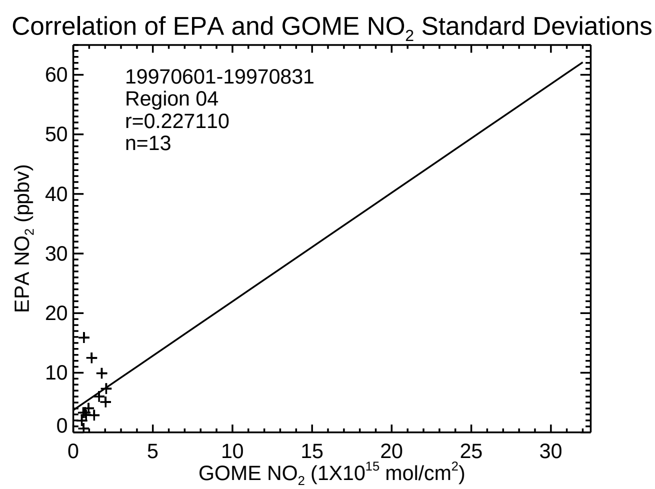

Correlation of EPA and GOME NO2
19970601-19970831
Region 03
r=0.172038
n=545
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
0
5
10
15
20


Correlation of EPA and GOME NO2 Means
19970601-19970831
Region 03
r=0.0132216
n=34
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
0
5
10
15
20

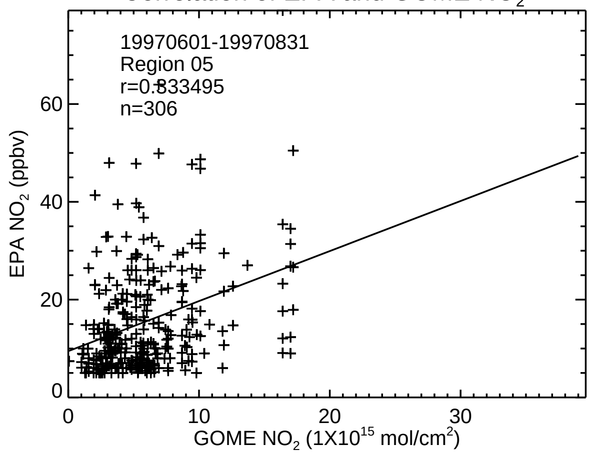

Correlation of EPA and GOME NO2 Standard Deviations
19970601-19970831
Region 03
r=-0.218686
n=34
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
0
5
10
15
20


Correlation of EPA and GOME NO2
19970601-19970831
Region 04
r=0.124706
n=165
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

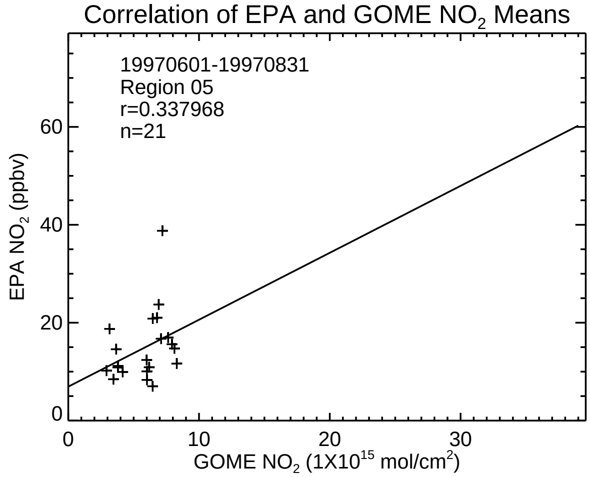

Correlation of EPA and GOME NO2 Means
19970601-19970831
Region 04
r=-0.00764944
n=13
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)


Correlation of EPA and GOME NO2 Standard Deviations
19970601-19970831
Region 04
r=0.227110
n=13
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)

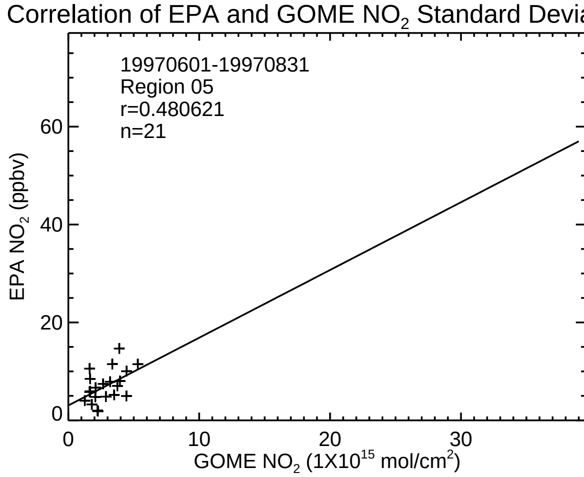
Correlation of EPA and GOME NO_2

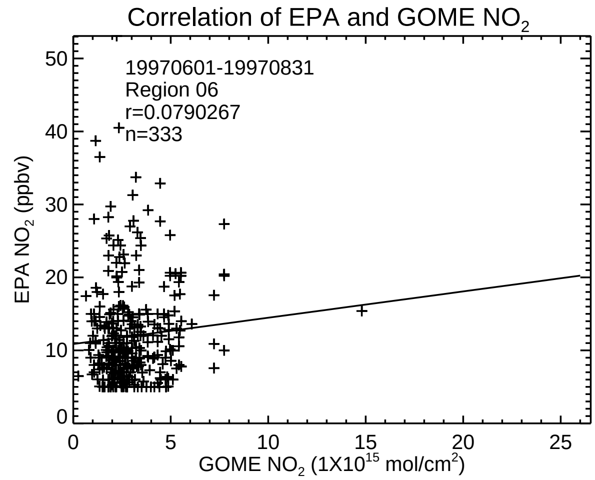


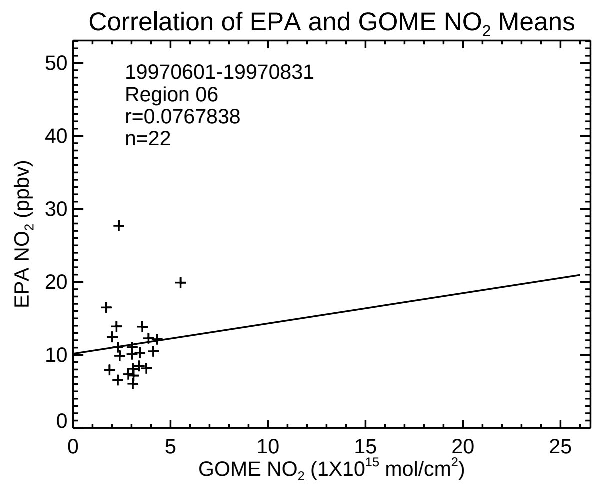
Correlation of EPA and GOME NO_2 Means

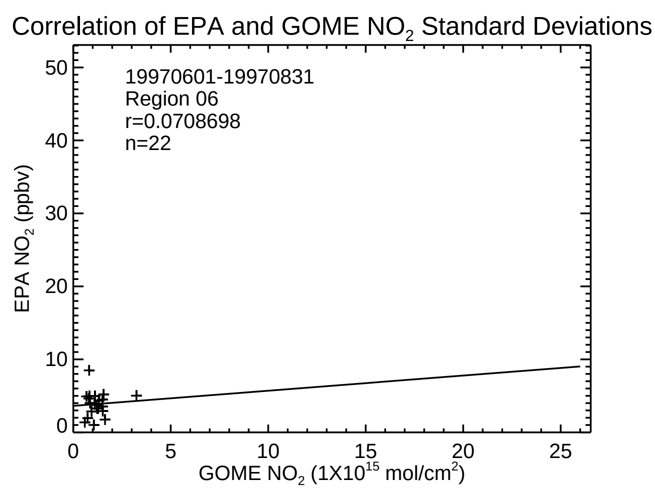


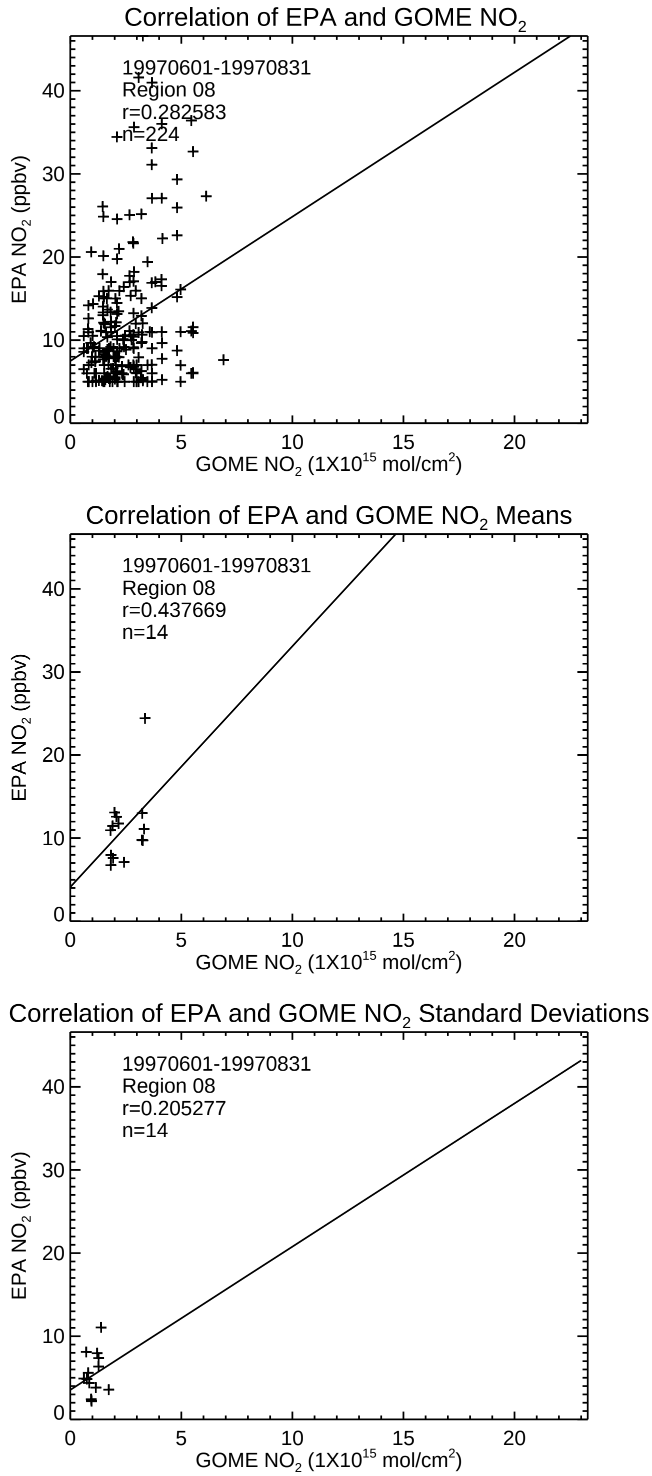
Correlation of EPA and GOME NO_2 Standard Deviations

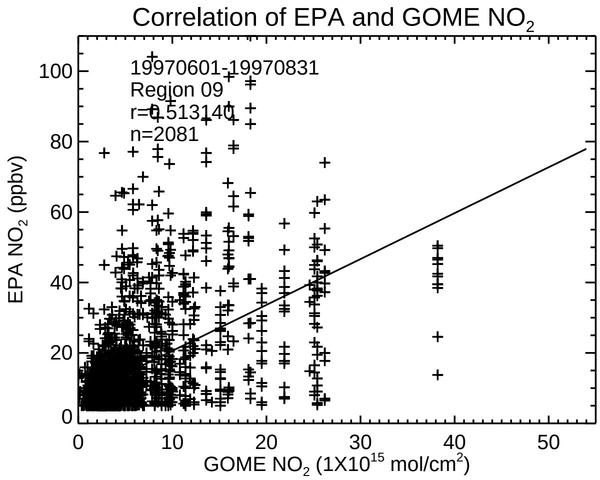


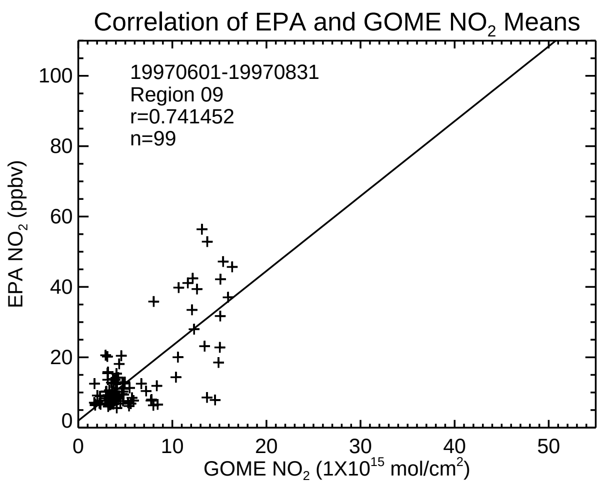

Correlation of EPA and GOME NO2
19970601-19970831
Region 06
r=0.0790267
n=333
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25

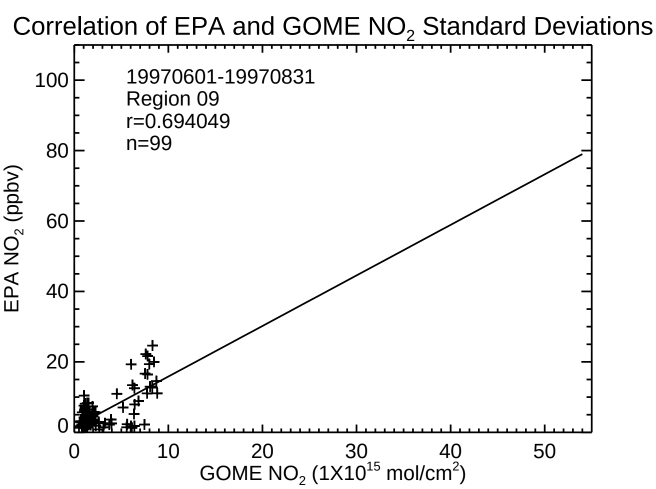

Correlation of EPA and GOME NO2 Means
19970601-19970831
Region 06
r=0.0767838
n=22
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25


Correlation of EPA and GOME NO2 Standard Deviations
19970601-19970831
Region 06
r=0.0708698
n=22
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
0
10
20
30
40
50
0
5
10
15
20
25


Correlation of EPA and GOME NO2
19970601-19970831
Region 08
r=0.282583
n=224
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Correlation of EPA and GOME NO2 Means
19970601-19970831
Region 08
r=0.437669
n=14
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)
Correlation of EPA and GOME NO2 Standard Deviations
19970601-19970831
Region 08
r=0.205277
n=14
EPA NO2 (ppbv)
GOME NO2 (1X10^15 mol/cm^2)


Correlation of EPA and GOME NO_2
19970601-19970831
Region 09
r=0.513140
n=2081
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)


Correlation of EPA and GOME NO_2 Means
19970601-19970831
Region 09
r=0.741452
n=99
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)


Correlation of EPA and GOME NO_2 Standard Deviations
19970601-19970831
Region 09
r=0.694049
n=99
EPA NO_2 (ppbv)
GOME NO_2 ($1X10^{15}$ mol/cm^2)

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14. ABSTRACT
Nitrogen dioxide is one of the U. S. EPA's criteria pollutants, and one of the main ingredients needed for the production of ground-level ozone. Both ozone and nitrogen dioxide cause severe public health problems. Existing satellites have begun to produce observational data sets for nitrogen dioxide. Under NASA's Earth Science Applications Program, we examined the relationship between satellite observations and surface monitor observations of this air pollutant to examine if the satellite data can be used to facilitate a more capable and integrated observing network. This report provides a comparison of satellite tropospheric column nitrogen dioxide to surface monitor nitrogen dioxide concentration for the period from September 1996 through August 1997 at more than 300 individual locations in the continental US. We found that the spatial resolution and observation time of the satellite did not capture the variability of this pollutant as measured at ground level. The tools and processes developed to conduct this study will be applied to the analysis of advanced satellite observations. One advanced instrument has significantly better spatial resolution than the measurements studied here and operates with an afternoon overpass time, providing a more representative distribution for once-per-day sampling of this photochemically active atmospheric constituent.

15. SUBJECT TERMS
Nitrogen dioxide, Nitrogen oxides, GOME, Air pollution, Earth Science data applications, Satellite data

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